ITT

ENGINEERED FOR LIFE

Fern Fleischer Daves

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October 7, 2015

US MAIL – RETURN RECEIPT REQUESTED
Donna Murray, Enforcement Coordinator
U.S. Environmental Protection Agency Region 1
Office of Site Remediation and Restoration
5 Post Office Square, Suite 100
Mail Code: OSRR07-2
Boston, MA 02109-3912

Re: Request for Information to Pursuant to Section 104 of CERCLA for the Keddy Mill Superfund Site, Windham, ME (the "Site")

Dear Ms. Murray:

Your colleague Susan Scott granted an extension for ITT Corporation ("ITT" or "Respondent") until October 7, 2015 to reply to the Request for Information referenced above ("104(e) Request").

Respondent respectfully objects to the scope of this 104(e) Request for several reasons. ITT Corporation is not a potentially responsible party at the Keddy Mill Superfund Site. Many of the documents and information requested are not in Respondent's possession. Respondent has only identified a limited number of historical records in the company archives which are relevant. Respondent has not identified any current or former employees with personal knowledge of these matters. This is not surprising given that the relevant transactions occurred more than 40 years ago. ITT's attached response is hereby provided in good faith, upon information and belief based upon documents in Respondent's archives that could be located since this 104(e) Request was received. Respondent reserves the right to supplement this response when and if additional relevant information becomes available.

In 1961, a subsidiary of Grinnell Corporation (Ace Investment Company or "ACE") acquired the

the stock of Keddy Manufacturing Company. Keddy Manufacturing Company became a division of Grinnell Corporation ("Grinnell") in May 1969. ITT and Grinnell entered into a merger agreement in 1969 but pursuant to anti-trust litigation with the U.S. Department of Justice, these companies were subject to a "hold separate" court order from the effective date of the merger until entry of the Final Judgment on September 24, 1971. This Final Judgment required ITT to place the assets of the Fire Protection Division of Grinnell into a new subsidiary in anticipation of the divestiture of that business. On November 2, 1971, Grinnell changed its name to ITT Grinnell Corporation ("ITT Grinnell").

On July 1, 1972, Grinnell Fire Protection Systems Company, Inc. ("GFPS") acquired the assets (including real property) and assumed all the liabilities of the Fire Protection Division of ITT Grinnell. In addition, GFPS indemnified ITT Grinnell for all claims arising from the operations of Fire Protection Division of Grinnell. If any environmental contamination did occur while the Keddy Mill was owned or operated by ACE, Grinnell or ITT Grinnell, GFPS assumed that liability in 1972. The stock of GFPS was acquired by Tyco Laboratories, Inc. in 1976.

Respondent has no independent information about the environmental conditions at the Site, and according to information that is publicly available from USEPA and the State of Maine, environmental contamination occurred at the Keddy Mill Site decades after these transactions.

Attached please find ITT Corporation's initial reply to the 104(e) Request. Additional information may be provided under separate cover.

Going forward, please direct all correspondence in this matter to my attention.

Sincerely,

Fern Fleischer Daves
Assistant General Counsel

cc: Susan Scott, Senior Enforcement Counsel, USEPA Region 1

Enclosures

ITT CORPORATION (RESPONDENT) REPLY TO USEPA
INFORMATION REQUEST REGARDING THE KEDDY MILL SUPERFUND SITE
10-7-2015

1. General Information About Respondent:

NOTE: All questions in this section refer to the present time unless otherwise indicated.

a. Provide the full legal name and mailing address of the Respondent:

ITT Corporation
1133 Westchester Avenue
White Plains, NY 10604

b. For each person answering these questions on behalf of Respondent, provide name, address, telephone number and email address :

Fern Fleischer Daves, Assistant General Counsel
Legal Department
ITT Corporation
1133 Westchester Avenue
White Plains, NY 10604
914-641-2148
fern.daves@itt.com

c. If Respondent wishes to designate an individual for all future correspondence concerning this Site, including any legal notices, please so indicate here by providing that individual's name, address, telephone number, and email address.

Fern Fleischer Daves, Assistant General Counsel
Legal Department
ITT Corporation
1133 Westchester Avenue
White Plains, NY 10604
914-641-2148
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2. Respondent's Legal and Financial Status:

NOTE: All questions in this section refer to the period being investigated.

a. If the Respondent has ever done business under any other name:

i. list each such name; and
ii. list the dates during which such name was used by Respondent.

Please refer to Exhibit A: Corporate Relationships

b. If Respondent is a corporation, provide:

i. the date of incorporation:*1995*
ii. state of incorporation: *Respondent was incorporated in Indiana*
iii. agent for service of process: *CT Corporation System, 111 Eighth Avenue, New York NY 10011*
iv. the names of current officers;
Denise L. Ramos, Chief Executive Officer and President
Aris C. Chicles, Executive Vice President and President, Industrial Process
Victoria Creamer, Senior Vice President, Human Resources and Chief Human Resources Officer
Mary Beth Gustafsson, Senior Vice President, General Counsel and Chief Compliance Officer
Luca Savi, Senior Vice President and President Motion Technology
Thomas M Scalera, Senior Vice President and Chief Financial Officer
Neil W. Yeargin, Senior Vice President and President, Interconnect Solutions
Steven Giuliano, Vice President and Chief Accounting Officer
Malcolm Miller, Treasurer
Michael J Savinelli, Assistant Treasurer
Craig E Johnson, Assistant Secretary
Lori B. Marino, Corporate Secretary

v. the names of current directors:
Orlando Ashford
Peter D'Aloia,
Donald DeFosset, Jr.
Christina A. Gold
Richard Lavin
Frank T. MacInnis
Rebecca A McDonald
Timothy H. Powers
Denise L. Ramos

c. If Respondent is, or was a subsidiary of, otherwise owned or controlled by, or affiliated with another corporation or entity including Grinnell Corporation, ITT Grinnell Corporation, and ITT Industries, Inc., describe each such relationship a general statement of the nature of the relationship; the dates such relationship existed; the percentage of ownership of Respondent that is or was held by such other entity or the percentage of ownership held by Respondent of such entity; and for each such affiliated entity provide the names and complete addresses of its parent, subsidiary, and otherwise affiliated entities.

Please refer to Exhibit A: Corporate Relationships.

d. Identify the corporate relationship between Keddy Manufacturing Company and Grinnell Corporation l/k/a ITT Grinnell Corporation, including whether Keddy Manufacturing Company was a division or wholly-owned subsidiary of Grinnell Corporation/ITT Grinnell Corporation, and the dates such relationship(s) existed.

Please refer to Exhibit A: Corporate Relationships.

e. If Respondent no longer exists as the same legal entity it was during the period being investigated because of transactions involving asset purchases or mergers, provide:

i. the titles and dates of the documents that embody the terms of such transactions *(i.e.,* purchase agreements, merger and dissolution agreements);
ii. the identities of the seller, buyer, and any other parties to such transactions; and
iii. a brief statement describing the nature of the asset purchases or mergers.

Please refer to Exhibit A: Corporate Relationships.

f. If Respondent has filed for bankruptcy, provide:

1. the U.S. Bankruptcy Court in which the petition was filed;
2. the docket numbers of such petition;
3. the date the bankruptcy petition was filed;
4. whether the petition is under Chapter 7 (liquidation), Chapter 11 (reorganization), or other provision; and
5. a brief description of the current status of the petition.

Respondent has not filed for bankruptcy.

3. Ownership at the Site:

NOTE: All questions in this section refer to the period being investigated. To the extent Respondent has information relating to Keddy Manufacturing Company and its ownership and operation at the Site, please respond to each question with respect to Keddy Manufacturing Company as well as Grinnell Corporation/ITT Grinnell Corporation.

a. Provide a detailed narrative description of Grinnell Corporation's purpose for acquiring the Site in 1969 and ITT Grinnell Corporation's purpose for selling of the Site in 1973.

Mr. Lawrence Keddy owned or controlled four companies jointly engaged in the production and sale of forged steel flanges with facilities in Maine and Massachusetts. At the time, the manufacturing plant referred to as the Keddy Mill in Windham, Maine (which is the subject of this inquiry) was operated by Cumberland Manufacturing Corporation and owned by Atlantic Mills, Inc. In 1961, Mr. Keddy transferred some – but not all – of the assets of these businesses to a new Delaware legal entity called Keddy Manufacturing Company. Thereafter, Mr. Keddy was employed by Grinnell as a manager. Notably, some of Mr. Keddy's assets were excluded from these 1961 transactions including certain equipment and certain real estate owned by Atlantic Mills, Inc. which was conveyed to Mallison Corporation. See documents attached hereto as Exhibit B.

Respondent does not have information with regard to ITT Grinnell Corporation's purposes of selling the site in 1973.

b. Did Grinnell Corporation acquire the Site after the disposal or placement of the hazardous substances on, in, or at the Site? Describe all of the facts on which you base the answer to the preceding question.

Respondent does not have this information.

c. Describe all investigations of the Site Grinnell Corporation undertook prior to acquiring the Site and all of the facts on which you base the answer to the preceding question.

Respondent does not have this information.

d. Provide copies of all deeds relating to past ownership, acquisition, and encumbrance of the Site.

Deeds related to the Site are public records. Real property records located in Respondent's historic files are included in Exhibit C.

4. Operations at the Site:

NOTE: All questions in this section refer to the period being investigated. To the extent Respondent has information relating to Keddy Manufacturing Company and its ownership and operation at the Site, please respond to each question with respect to Keddy Manufacturing Company as well as Grinnell Corporation/ITT Grinnell Corporation.

a. Describe all activities undertaken at the Site by Grinnell Corporation/ITT Grinnell Corporation during its ownership of the Site, or before, or after its period of ownership, including but not limited to:

1. a brief narrative of the day-to-day operation of the Site;
2. a description of the activities at the Site by date;
3. a description of the generation, storage, placement, disposal or treatment of wastes at the Site by date;
4. the identification of lessees, contractors, tenants or others who carried out operations at the Site;
5. a description of the activities each lessee, contractor, tenant or others took at the site by date:
6. a description of the construction and/or demolition of any surface or
7. subsurface structures at the Site (including but not limited to the dates such activities took place); and
8. a description of the collection of monies or other compensation for use of the Site by others; and
9. a description of any other significant operations or activities at the Site.

Respondent does not have this information.

b. If the nature or size of Grinnell Corp./ITT Grinnell Corp.'s operations changed over time, describe those changes and the dates they occurred.

Respondent does not have this information.

c. List the products Grinnell Corp./ITT Grinnell Corp. manufactured, recycled, recovered, treated, or otherwise processed in these operations.

Pipefittings were manufactured at the Site. See Exhibit D: Grinnell Pipe Fittings Catalog 1972.

d. In general terms, list the types of raw materials used in Grinnell Corp. / ITT Grinnell Corp.'s operations.

Respondent does not have this information.

e. Describe the cleaning and maintenance of the equipment and machinery involved in these operations, including but not limited to:

1. the types of materials used to clean/maintain this equipment/machinery; and
2. the monthly or annual quantity of each such material used.

Respondent does not have this information.

f. Describe the methods used to clean up spills of liquid or solid materials during operation, including but not limited to:

1. the types of materials spilled in operations;
2. the materials used to clean up those spills;
3. the methods used to clean up those spills; and
4. where the materials used to clean up those spills were disposed of.

Respondent does not have this information.

g. Describe all leaks, spills, or releases at or from the Site of materials that were or may have been hazardous, toxic, :flammable, reactive, or corrosive, or may have contained hazardous substances, including, but not limited to:

1. the date of each such occurrence;
2. the specific location on the Site of each such occurrence; and
3. the materials that were involved in each such occurrence in terms of the nature, composition, color, smell, and physical state (solid or liquid) of such material.

Respondent does not have this information.

h. Describe and provide the dates of all activities undertaken by Grinnell Corp./ITT Grinnell Corp and others to:

i. address all leaks, spills, or releases of materials at or from the Site; and IL to prevent a threatened leak, spill, or release at or from the Site.

Respondent does not have this information.

i. Describe all fires, explosions, or similar occurrences at the Site, including but not limited to:

1. the dates of such occurrences;
2. the specific locations on the Site of such occurrences;
3. the nature of such occurrences; and
4. the measures taken to respond to them.

Respondent does not have this information.

j. Provide all information you have regarding the disposal, treatment, storage, or recycling of wastes at the Site during the period being investigated.

Respondent does not have this information.

k. Provide all information you have that during the period being investigated: the wastes disposed, treated, stored, placed or recycled at the Site included hazardous substances; and hazardous substances were released at the Site.

Respondent does not have this information.

l. Identify all surveys, studies, or collections of data for which Respondent has submitted information to local, state, federal, or private entities concerning the Site.

Respondent has not submitted such information to any governmental or private entities

m. Provide a copy of the information submitted by Respondent for such survey or study.

Not applicable.

n. Provide a copy of the resulting survey, study, or collection of data.

Not applicable.

5. Insurance Coverage:

NOTE: All questions in this section refer to the time period from 1961to1974.

a. Provide copies of all casualty, liability and/or pollution insurance policies, and any other insurance contracts referencing any properties that comprise the Site (your response to this question should include, but is not limited to, any insurance policies associated with the Keddy Manufacturing Company or Grinnell Corporation/ITT Grinnell Corporation).

Respondent has not located any insurance policies but see Exhibit E.

6. Information About Others:

a. If you have information concerning the operation or ownership of the Site or the source, content or quantity of materials placed/disposed at the Site which is not included in the information you have already provided, provide all such information.

b.

Respondent does not have this information.

c. Ifnot already included in your response, if you have reason to believe that there may be persons, including persons currently or formerly employed by Respondent, who are able to provide a more detailed or complete response to any of these questions or who may be able to provide additional responsive documents, identify such persons and the additional information or documents that they may have.

Respondent has not identified any such persons.

d. Ifnot already provided, identify all persons, including Respondent's current and former employees, who have knowledge or information about the

generation, use, purchase, treatment, storage, disposal, placement or other handling of materials at, or transportation of materials to, the Site.

Respondent has not identified any such persons.

DECLARATION

I am authorized to respond on behalf of ITT Corporation to the USEPA Request for Information regarding the Keddy Mill Superfund Site, and that upon information and belief the foregoing response is true and correct as of this date based upon my review of documents available in company archives.

Executed on October 7, 2015

Signature
Fern Fleischer Daves
Assistant General Counsel

10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

Exhibits A – E

10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

ITT Exhibit A: Corporate Relationships

Respondent objects to the scope of question 2 as overly broad and unduly burdensome, as the names and relationships between Respondent and its various subsidiaries and affiliates and the hundreds of companies acquired, divested and dissolved over many decades are not relevant in any way to this inquiry.

Without waiving its objections, the following information which may be relevant to the Keddy Mill Superfund Site is hereby provided upon information and belief based upon historic documents.

ITT:

International Telephone and Telegraph Corporation was originally incorporated in Maryland in 1920, and reincorporated in Delaware in 1968 ("ITT Delaware"). ITT Delaware changed its name to ITT Corporation in 1983.

Respondent ITT Corporation is an Indiana corporation incorporated on September 5, 1995 as ITT Indiana, Inc. ("ITT Indiana") which is the successor pursuant to a statutory merger of ITT Delaware into ITT Indiana effective December 20, 1995, whereupon its name became ITT Industries, Inc.

On December 19, 1995, ITT Delaware made a distribution (the "1995 Distribution") to its stockholders consisting of all the shares of common stock of ITT Destinations, Inc., a Nevada corporation (ITT Destinations), and all the shares of common stock of ITT Hartford Group, Inc., a Delaware corporation (now known as The Hartford Financial Services Group, Inc. or The Hartford), both of which were wholly-owned subsidiaries of ITT Delaware. In connection with the 1995 Distribution, ITT Destinations changed its name to ITT Corporation. On February 23, 1998, ITT Corporation was acquired by Starwood Hotels & Resorts Worldwide, Inc. Thereafter, the name ITT Corporation was acquired by ITT Industries, Inc.

On July 1, 2006.ITT Industries, Inc. changed its name to ITT Corporation. Respondent's list of subsidiaries from its most recent 10K report to the US Securities and Exchange Commission can be found at http://www.sec.gov/Archives/edgar/data/216228/000021622815000007/exhibit212014.htm

Keddy/Grinnell:

In 1961, Mr. Lawrence Keddy transferred certain assets from four separate legal entities

- Keddy Manufacturing Corporation, a Massachusetts company
- Abbott Steel Corporation, a Massachusetts company
- Cumberland Manufacturing Corporation, a Maine company
- Atlantic Mills, Inc., a Massachusetts company

into a new Delaware company named Keddy Manufacturing Company ("Keddy Delaware"). This series of transactions included transfer to Keddy Delaware some but not all parcels of real property in South Windham, Maine owned by Atlantic Mills, Inc., and operated by Cumberland Manufacturing Corporation. Such real property is the subject of this 104(e) Request. This deal was completed when

Ace Investment Company (then a subsidiary of Grinnell) acquired 100 shares of common stock of Keddy Delaware.

In March 1969, ITT and Grinnell entered into a merger agreement. In the subsequent months, Grinnell consolidated a number of businesses. In May 1969, Ace Investment Company transferred the assets and assigned the liabilities of Keddy Delaware to Grinnell and the subject real property in Windham Maine was conveyed to Grinnell. Thereafter, the Keddy Mill business operated as a Division of Grinnell.

In August 1969, the U.S. Department of Justice filed anti-trust litigation to prevent the merger of ITT and Grinnell. The companies were subject to a "hold separate" federal court order as of the effective date of the merger (October 31, 1969). Grinnell continued to consolidate various legal entities. In December 1969, Keddy Delaware was dissolved. In April 1971, Ace Investment Co. merged into Grinnell Corporation, with Grinnell being the surviving entity.

In September 1971, the federal court entered a Final Judgment which required ITT to place the assets of the Fire Protection Division of Grinnell into a new subsidiary in anticipation of divestiture. On November 2 1971, Grinnell Corporation changed its name to ITT Grinnell Corporation. On November 5, 1971, a new legal entity was formed in Delaware to hold the assets of the Fire Protection Division named Grinnell Fire Protection Systems Company, Inc. ("GFPS"). GFPS acquired the assets and assumed the liabilities of the Fire Protection Division of ITT Grinnell in July 1972.

On January 1, 1976, the stock of GFPS was acquired by Tyco Laboratories, Inc.

10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

ITT Exhibit B: Correspondence re: Keddy Mill

- 5/18/61 letter from Grinnell to S. Klivansky re: Grinnell-Keddy agreement (4 pages)
- 5/18/61 letter from Grinnell to B. Whitehouse re: Keddy real estate in Windham Maine (2 pages)
- 5/26/61 letter from Grinnell to Mr. Keddy re: offer to purchase business
- 5/29/61 letter from L. Wood to Grinnell re: purchase of South Windham, Maine real property (3 pages)
- Undated handwritten drawing of real property boundaries (1 page)
- 6/6/61 attorney's certficate from S. Klivansky to Keddy Manufacturing Co regarding 4 transactions to be consummated (2 pages)
- 6/6/61 letter from Mallison to Keddy Manufacturing re: power (1 page)
- 6/6/61 letter from Keddy Manufacturing to L. Wood re: deed of premises in South Windham Maine (1 page)
-
- 6/9/61 letter from Grinnell to H. Withers re: Ace subscription of Keddy Manufacturing Co. stock (1 page)
- 6//8/61 letter from Grinnell to C. Branch re: acquisition of Keddy real estate (2 pages)
- 6/9/61 letter from H. Mitherz to Grinnell re: corporate name change (1 page)
- 6/15/61 letter from C. Branch to L. Wood re: discharge of mortgages (2 pages)
- 6/15/61 letter from C. Branch to S. Klivansky re: real property (1 page)
- 6/19/61 letter from L. Keddy to Grinnell re: terms of transaction (2 pages)
- 6/19/61 letter from H. Mitherz to Grinnell re: stock certificate for Keddy Manufacturing (1 page)
- 6/20/61 letter from Grinnell to H. Mitherz re: Keddy
- 6/20/61 letter from Grinnell to L. Keddy re: non-current inventory (2 pages)
- 6/26/61 letter from Grinnell to L. Keddy re: non current inventory (1 page)
- 6/27/61 letter from C. Branch to L. Wood re: satisfaction of mortgage (1 page)
- 6/23/61 title insurance binder (1 page)
- 6/17/61 letter to C. Branch re: purchase of South Windham property (1 page)
- 6/25/61 letter from C. Branch to Grinnell re: deeds and title insurance (1 page)
- 7/7/61 letter from Grinnell to E. Mullaney re: Keddy Manufacturing stock holders meeting (1 page)
- 7/_//61 stockholder proxy (1 page)
- 8/20/61 minutes of Keddy Manufacturing stockholders meeting (3 pages)
- 8/23/61 minutes of Keddy Manufacturing Board of Directors meeting (2 pages)
- 8/28/62 minutes of Keddy Manufacturing stockholders meeting (2 pages)
- 6/14/65 letter from Grinnell to C. Branch regarding equipment (1 page)
- 6/23/65 minutes of Keddy Manufacturing stockholders meeting (2 pages)
- 6/18/65 conditional sale agreement for equipment located at Windham Maine (2 pages)
- One page specifications for forging hammer (1 page)
- 6/19/65 letter regarding equipment sale (1 page)
- 5/5/69 handwritten drawing of map of Keddy property in Windham, ME (2 pages)
- 4/21/69 letter from Town of Windham to C. Branch re: real estate taxes (1 page)
- 4/25/69 letter from C. Branch to Grinnell re: personal property tax (1 page)

- 4/29/69 Payment and Assignment Agreement conveying Keddy stock from ACE to Grinnell (2 pages)
- 4/29/69 Unanimous Action of Board of Directors of Ace Investment Company declaring dividend of all of the shares of Keddy Manufacturing Stock and assigning promissory notes to Grinnell (2 pages)
- 4/29/69 Contribution Dedication and Release to quitclaim indebtedness from Keddy to Grinnell (1 page)
- 4/29/69 Transfer and Assignment of Keddy Promissory Notes from ACE to Grinnell (2 pages)
- 4/30/69 letter from President of Grinnell to former Board of Directors, Officers and Certain Employees of Keddy Manufacturing removing and replacing directors and officers and terminating certain employees (1 page)
- 4/30/69 Keddy Secretary's certificate regarding new officers (1 page)
- 4/30/69 list of documents and tasks to dissolve Keddy
- 5/1/69 letter from Grinnell to A. Fritzcsche regarding tax benefit to be realized by liquidating subsidiary and making it a division of Grinnell (1 page)
- 5/1/69 Grinnell announcement that Keddy Manufacturing will be operated as a Division of Grinnell under the direction of Earl G. Page, Jr. (1 page)
- 5/2/69 letter from Grinnell to H. Mithers re: 4/29/69 actions of Ace (1 page)
- 5/3/69 letter from D. McKenney to C. Rison re: recapitalization of Keddy Manufacturing (2 pages)
- Keddy Manufacturing Co. stock certificate endorsed to Grinnell Corporation (2 pages)
- 5/5/69 Grinnell letter to H. Mitherz re: Keddy consents (1 page)
- 5/5/69 H. Mithers letter to Grinnell transmitting stock certificate and resolution (1 page)
- 5/7/69 letter from D. McKenney to C. Rison transmitting stock certificate and consents (1 page)
- 5/8/69 letter from H. Mitherz to Grinnell transmitting 4/29 documents (1 page)
- 5/9/69 letter from Grinnell to Cumberland County Maine Registry of Deeds requesting plan of property conveyed from Atlantic Mills to Keddy Manufacturing (1 page)
- 5/13/69 Letter from D. McKenney to R. Hart transmitting statement for real estate taxes for Windham (1 page)
- 5/15/69 memorandum from D. McKenney regarding equipment installment purchase arrangements (1 page)
- 5/19/69 letter from Grinnell to R. Jacobsen regarding liquidation of Keddy (1 page)
- 5/20/69 letter from R. Jacobsen to Grinnell regarding liquidation of Keddy (1 page)
- 5/21/69 letter to Grinnell re: liquidation of Keddy (1 page)
- 5/23/69 letter to Grinnell re: transfer of assets from Keddy to Grinnell (1 page)
- 5/27/69 letter from Grinnell re: liquidation of Keddy (1 page)
- Undated file memorandum re: transfer of real properties prior to Keddy being dissolved (1 page)
- 6/3/69 transmittal letter (1 page) with Instrument of Transfer and Assignment and Assumption of Liabilities of Keddy Manufacturing to Grinnell dated 5/26/69 (5 pages)
- 6/3/69 transmittal letter, Form 966 Corporate Dissolution or Liquidation Form for Keddy Manufacturing Co. dated 5/26/69 and Plan of Liquidation ((5 pages)
- 6/5/69 transmittal letter to Grinnell (1 page) – no attachment
- 7/25/69 transmittal letter with 1 page attached index of documents relating to liquidation of Keddy
- 8/22/69 letter from Grinnell to C. Branch referring to liquidation of Keddy and that "plants are now being operating under the name of Keddy Manufacturing Co, a Division of Grinnell Corporation"
- 8/16/59 transmittal letter from land surveyor to Grinnell referring to South Windham property (no attachment)

- 10/17/69 transmittal letter from Grinnell to Cumberland County Registry of Deeds with attached deed dated October 17, 1969 conveying Windham property from Keddy to Grinnell (5 pages)
- 10/22/69 check request for recording fee for deed of Windham property
- 12/29/69 letter from Grinnell to Corporation Trust with 3 page Certificate of Dissolution of Keddy Manufacturing
- 12/31/69 letter from Corporation Trust indicating that Dissolution of Keddy was duly filed and recorded in Delaware
- 5/5/70 memo regarding dissolution of Keddy
- Undated notice from Maine Secretary of State with handwritten notes in top right corner re: Keddy
- 2/1/70 notice from Maine Corporation Division re: annual license fee for Keddy Manufacturing
- 5/2/71 State of Delaware Certificate of Amendment of Grinnell Corporation changing its name to "ITT Grinnell Corporation" (5 pages)
- 6/30/72 Assignment and Assumption of Liabilities Agreement between ITT Grinnell Corporation and Grinnell Fire Protection Systems Company, Inc. (6 pages)

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO—

May 18, 1961

Samuel M. Klivansky, Esquire
Security Trust Building
Lynn, Massachusetts

Dear Mr. Klivansky:

I enclose two copies of redraft of proposed Grinnell-Keddy agreement. If this is satisfactory to you and Mr. Keddy, I will prepare it in final form.

We have incorporated, in Delaware, Keddy Mfg. Co., Inc. We will, I think, need the consent of Keddy Manufacturing Corporation to qualify this company in Massachusetts and possibly in Maine if Keddy Manufacturing Corporation is qualified in Maine. Will you please send me certified copy of corporate vote of Keddy Manufacturing Corporation consenting to the use by Keddy Mfg. Co., Inc. of such name in Massachusetts, and of a companion vote if Keddy Manufacturing Corporation is qualified in Maine.

What I need now, which I understand you will send me, is:

1. A statement as to each of the four companies, specifying -

(a) Its correct corporate name.

(b) Its authorized and issued stock and a list of its stockholders.

(c) Its officers and directors.

(d) Its state of incorporation and whether it is qualified in any other state. If so, where.

2. A complete schedule of all insurance (including fire, liability, workmen's compensation, etc.), indicating -

(a) Company insured.

(b) Coverage and limits.

(c) Insuring company and expiration date.

(d) Premium, and for what period paid.

(This will include insurance on real estate owned by Mr. Keddy personally.)

3. A detailed schedule of all secured obligations of any of the companies and of Mr. Keddy personally relating to the real estate we are purchasing, indicating -

(a) Name and address of lender.

(b) Date, unpaid amount, interest rate and how payable.

(c) Property mortgaged or pledged (including property purchased on conditional sale).

(d) If recorded, recording place and reference.

4. A schedule of all other company obligations (including intercompany obligations and obligations due Mr. Keddy personally).

5. A copy of the Walworth agreement which Mr. Keddy referred to.

6. A description of the Middleton real estate to be transferred to us (excluding the property to be retained south of Birch Street).

7. The description of the Windham property to be transferred which Mr. Keddy left with me refers to -

(a) Rights described in deed of Atlantic Mills to Mallison Corporation.

(b) Rights of Central Maine Power Company under deed of July 25, 1945.

(c) Right of way of Central Maine Power Company under deed of October 6, 1944.

(d) Agreement of July 25, 1913 between DuPont and Androscoggin Pulp Company.

We want to know what these rights are and the extent to which they affect the property; and in the case of rights of way where they are physically located on the property.

We may have similar questions as to the Middleton property when we see the description of the same.

As I advised you, we have asked Verrill Dana Walker Philbrick & Whitehouse of Portland to issue a Lawyers Title policy on the Maine property, and I am proceeding to ask Parsons, Arnold & Morgan of Lynn to do the same with respect to Windham. You may prefer to have them answer my real estate questions.

8. I understood you or Mr. Keddy were to provide us, with the assistance of his accountants, with a proposed breakdown of the $900,000 item of the price, showing the allocation of the same to the two parcels of real estate, separately, as to land and buildings, and as to the balance as between the various corporations concerned.

In connection with the closing, we shall need, among other things -

1. Deeds of the real estate.

2. Bills of sale of all other property transferred.

3. Certificates of votes of all of the companies authorizing the sale of the respective assets transferred by them and designating who is to execute the documents of transfer.

4. Your certificate, as counsel for Keddy and the four corporations, that all corporate action has been duly taken in accordance with Massachusetts or Maine law, as the case may be, and in accordance with their respective charters and by-laws.

5. Evidence of complete discharge of all mortgages, conditional sales, pledges, assignments and other secured obligations.

6. Your opinion as to title to the assets transferred, other than real estate.

7. Commitments to issue title policies on the real estate upon recording of the deeds.

I received your message asking for a copy of the proposed employment agreement. I have not yet drafted this but the enclosed letter states the gist of this.

I will try to get at this in the next few days and will send you a draft then.

Very truly yours,

Roger T. Clapp
Secretary and Counsel

RTC:W

P.S.

We will probably need also an independent accountant's or attorney's certificate that, based on inspection of the books and accounts of the companies involved, the schedule of secured obligations is complete and accurate and that there are no other such obligations.

-Letterhead of-

GRINNELL CORPORATION

PROVIDENCE 1, R. I.

May 12, 1961

Brooks Whitehouse, Esquire
Verrill Dana Walker Philbrick & Whitehouse
57 Exchange Street
Portland, Maine

Dear Mr. Whitehouse:

We have negotiated with Mr. Lawrence Keddy, of the Keddy Manufacturing Corporation, to purchase, among other items, his manufacturing plant at South Windham, Maine, which I believe is operated by the Cumberland Manufacturing Corporation and owned by Atlantic Mills, Inc. I am writing you with the permission of Mr. Keddy.

I understand that you at some point examined and certified the title to the above South Windham plant property.

We wish to obtain a title policy insuring the title to the South Windham plant property. I understand from their local representative here in Providence, Mr. Melvin A. Cherniok, that your firm are attorneys on the approved list of the Lawyers Title Insurance Company of Richmond, from which I assume that you are in a position to examine the title and arrange for the issuance of the title policy by the Lawyers Company.

We would be taking title in the name of a subsidiary we plan to incorporate in Delaware, which we will qualify in Maine, to be known probably as Keddy Manufacturing Company, Inc. The proportion of the price attributable to the above plant has not yet been determined.

We should like to complete this transaction at an early a date as possible, in any event prior to the end of this month. For business reasons, we wish to keep confidential, for the time being at least, our interest in this situation.

Brooks Whitehouse, Esquire May 12, 1961

Please let me know if your firm can take care of this.

Yours very truly,

RTC:W Roger T. Clapp, Counsel

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE I, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO—

December 26, 1961

Mr. Lawrence Keddy
C/o Keddy Manufacturing Corporation
Middleton, Massachusetts

Dear Mr. Keddy:

You have represented to us:

1.

That you own or control all of the following companies jointly engaged in the production and sale of forged steel flanges and other products, with plants at Middleton, Massachusetts and at South Windham, Maine, namely,

Keddy Manufacturing Corporation,
a Massachusetts corporation

Abbott Steel Corporation,
a Massachusetts corporation

Cumberland Manufacturing Corporation,
a Maine corporation

Atlantic Mills, Inc.
a Massachusetts corporation

2.

That the real estate and tangible assets employed in the above business are owned as follows:

(a) Plant land and buildings in Middleton by you personally.

(b) Plant land and buildings in South Windham by Atlantic Mills, Inc.

(c) Inventory by Keddy Manufacturing Corporation.

(d) Machinery, shop and office equipment, dies, tools, jigs, fixtures, automotive equipment and other tangible assets other than inventory by Keddy Manufacturing

Corporation or by Abbott Steel Corporation or by Cumberland Manufacturing Corporation.

We make you the following offer:

1.

We will cause to be incorporated in Delaware a company to be known as Keddy Mfg. Co., Inc., or some other appropriate name, which we will refer to hereafter as the X Company, and will designate its officers and directors. You will cause Keddy Manufacturing Corporation to consent to the use of a similar name.

2.

You will personally transfer and cause such of said corporations as own the same to transfer to the X Company:

All of the assets, including trade marks, trade names, patents (if any) and goodwill, now owned by the above companies, excepting only cash and accounts receivable, together with the real estate constituting the Middleton plant owned by you personally including, but without limiting the above generality, all land and buildings (being the Middleton and South Windham plants), all machinery, shop and office furniture, fixtures, equipment and supplies, blank and finished dies, jigs, tools, fixtures, automotive equipment, inventories (raw, finished and in process), plans, drawings, customer lists, catalogs, other sales material and insurance, except only for changes to date of closing in the ordinary course of business. In addition there will be assigned existing agreement between Keddy Manufacturing Corporation and Walworth Company.

Excluded from the above are:

1. Certain real estate owned by Atlantic Mills, Inc. south of the Windham plant property conveyed, or to be conveyed, to Mallison Corporation and shaded on map included in folder you gave us entitled "Maine Plant."

2. Certain real estate owned by you adjacent to the Middleton plant located southerly of Birch Road.

3. At Middleton an uninstalled Diesel engine with equipment and certain hydraulic turbine parts.

4. At Windham parts of an Ingersoll-Rand compressor, a 20,000-lb. unassembled Massey-Harris forging hammer and certain hydraulic turbine parts.

3.

Between the date of your acceptance of this offer and the time of closing you will not personally, and will not permit any of said companies to, dispose of any real estate or tangible assets without our consent, except as to sales of inventory in the ordinary course of business.

4.

The price to be paid by the X Company shall be computed as follows:

(a) For all items listed in paragraph 2 above, other than inventory items, $900,000.

(b) For finished carbon steel inventory, your now current list prices less 28%-12½%-5%-10%.

(c) For finished stainless steel inventory, your now current best prices to distributors less 10%.

(d) For work in process, the above prices ("b" and "c") less in each case 25%.

(e) For stainless and alloy bar steel, your purchased cost.

(f) For carbon bar steel, 6¢ per pound.

(g) For scrap, 2¢ per pound.

(h) "Universal flanges" are all to be priced at the above finished inventory prices.

(i) The counts of each of the above groups of items are to be determined by an inventory taken at closing approved by our representative who shall be present.

5.

Herewith is our check on account of said price for $75,000 payable to the order of Keddy Manufacturing Corporation, which amount you will cause to be refunded to us if you

are unable at the closing to meet the terms and conditions of this offer. The balance of the price shall be paid in cash at closing, to be distributed as you, with the advice of your accountants, direct between yourself and said corporations.

6.

All of the assets listed in paragraph 2 shall be transferred at closing to the X Company by good and sufficient deeds and bills of sale free of all encumbrances except liens for current real estate taxes, which taxes together with prepaid insurance shall be prorated at closing.

The completion of this purchase shall be subject to submission by you of opinion satisfactory to us by attorneys satisfactory to us as to free and clear title to all personal property transferred and to our securing satisfactory title insurance as to all real estate.

7.

At the closing all secured or unsecured obligations of all of said corporations (except only current accrued and accruing tax liabilities) and all obligations secured by or a lien upon any of said real estate (except liens for current taxes) shall be paid and discharged to our satisfaction. Following the closing you will proceed with and complete as expeditiously as possible the dissolution of Keddy Manufacturing Corporation and will from time to time at our request furnish us, or cause said corporations to furnish us, for our own accounting use fiscal data we may need from your and their books and records.

8.

At closing we will execute an employment agreement with you under which -

(a) We will employ, or cause one of our subsidiaries (including the X Company) to employ, you for such duties (being a position of, or equivalent to, Plant Manager) and in such place or places as we shall from time to time specify for a minimum period of eight years at a minimum compensation of $15,000 per year, payable monthly, for the first three years and of $15,000 per year, payable monthly, plus an annual year-end bonus of $3,000 for the remaining five years.

(b) You will serve full time and will not during the period of your employment or for five years after any termination of the same engage directly or indirectly in the manufacture or sale of forged steel flanges or of other items now produced by said corporations.

(c) During the period of your employment you will disclose to us any inventions made or developed by you and will transfer without further consideration to us all rights to such inventions.

(d) Your employment will cease in case of your death or incapacity. We reserve the right to grant you at any time a fixed or indefinite leave of absence but without forfeiture of compensation.

9.

The completion of this transaction shall be further conditional on our counsel being satisfied from opinions of your counsel or otherwise that all necessary corporate action on your part to authorize the completion of this transaction has been properly and legally taken to the end that our counsel is satisfied from such opinion and from opinions as to title to personal property and title insurance commitments as to real estate that we will acquire good and unencumbered title to all assets to be purchased subject to no obligations of any character, secured or unsecured, except as specifically stated herein.

10.

The closing shall take place at our office in Providence at a mutually agreeable time but not later than May 31, 1961, unless this is extended by mutual agreement or inability of either party to be ready to close on or before that date.

If the above is agreeable to you, kindly sign and return to us the enclosed duplicate original of this letter.

Very truly yours,
GRINNELL CORPORATION

JDF:CW

J. D. Fleming, President

Accepted:

_____

VERRILL DANA WALKER PHILBRICK & WHITEHOUSE
ATTORNEYS AT LAW
57 EXCHANGE STREET
PORTLAND, MAINE

TELEPHONE
SPRUCE 4-4573

HARRY MICHELS VERRILL
JOHN FESSENDEN DANA
LEON VALENTINE WALKER
DONALD WARD PHILBRICK
ROBINSON VERRILL
BROOKS WHITEHOUSE
EDWARD FOX DANA
DONALD LOCKEY PHILBRICK
ROGER ASHURST PUTNAM
ROBERT B. WILLIAMSON, JR.
JOHN ALBERT MITCHELL
LOUIS ALFRED WOOD

May 29, 1961

Roger T. Clapp, Counsel
Grinnell Corporation
Executive Offices Building
Providence 1, Rhode Island

Dear Mr. Clapp:

Re: Keddy Manufacturing Co. Purchase of South Windham Property.

Pursuant to your request, we have searched the record title to property located at Little Falls at South Windham in the Town of Windham, County of Cumberland and State of Maine, to be conveyed from Atlantic Mills, Inc. to Keddy Manufacturing Co. As of 8:59 a.m. on the 29th day of May 1961 we find record title to the premises to be in Atlantic Mills, Inc. free and clear of encumbrances with no attachments outstanding, except as follows:

1. An unrecorded Maine Central Railroad side track agreement concerning 700 feet of track owned by the Maine Central Railroad which is located along the easterly side line of the property to be conveyed. There is a yearly charge of approximately $350 paid to the railroad when the side track is actually in use. Although this agreement is unrecorded, there is mention of it in the recorded deeds. I understand from our telephone conversation that you know the details concerning this agreement.

2. A Central Maine Power Company service line easement extending southerly from Depot Street to the main factory building. This right of way was conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348.

3. Two rights of way reserved in the deed of Cumberland Securities Corporation to Windham Fibres, Inc. dated July 25, 1945, recorded in said Registry of Deeds, Book 1787, Page 353. These rights of way are appurtenant to a sub-station which now belongs to Mallison Corporation, said substation being located on property now belonging to Atlantic Mills, Inc. - not the property to be conveyed to Keddy Manufacturing Co. The rights of way cross the property

to be conveyed to Keddy Manufacturing Co. on the easterly side adjacent to the railroad property and on the westerly boundary at Main Street. These rights of way are 100 feet in width, but only a few feet of this width encumber the subject premises. These rights of way would in no way affect the efficient operation of the manufacturing plant on the premises nor would the rights of way in any way hinder travel in and around the buildings. The right of way referred to in subparagraph 2 above and the rights of way referred to in this subparagraph 3 are now owned by Mallison Corporation.

The following are encumbrances to be discharged prior to or at the time of closing:

4. A mortgage of the subject premises by Atlantic Mills, Inc. to Albert Shore dated April 28, 1959, recorded in said Registry of Deeds, Book 2486, Page 102.

5. A chattel mortgage by Atlantic Mills, Inc. to Albert Shore dated April 28, 1959, recorded in said Registry of Deeds, Book 2468, Page 107. This chattel mortgage covers heavy equipment such as generators, turbines and hydraulic equipment which are no doubt affixed to the realty.

6. Real estate taxes due the Town of Windham for the year 1961 were assessed as of April 1, 1961 but the tax bills have not yet been sent out. No doubt the parties to the closing will want to prorate the taxes. In talking to the town taxing officials, I was not able to get a firm commitment out of them as to exactly how much the 1961 taxes would be.

Mr. Laurence Keddy has informed me that you are interested in the following information:

7. DuPont Agreement 1913. This agreement between DuPont and the Androscoggin Pulp and Paper Company on July 15, 1913 concerned the height at which water might be maintained at the Little Falls dam in order not to encumber the efficient operation of a dam operated by DuPont further up the Presumpscot River. This agreement would now apply to the dam and land which will be retained by Atlantic

Mills and will not affect the title to the property to be conveyed.

8. There was a right of way reserved in the Cumberland Securities Corporation deed to Windham Fibres, Inc. aforesaid, extending southerly from Depot Street to the dam on the Presumpscot River. Since Atlantic Mills now owns the dam and the property to be conveyed, the right of way which once existed has been merged and Atlantic Mills will convey free of this right of way.

9. There will be conveyed as appurtenant to subject premises a right of way 30 feet in width extending from Main Street easterly over the remaining land of Atlantic Mills, Inc. to a doorway in the westerly side of the main factory building. This right of way is necessary if the doorway is to be rightfully used.

I have not included in this letter an opinion concerning the personal property since this has not been requested and have only included the one chattel mortgage since it may apply to fixtures.

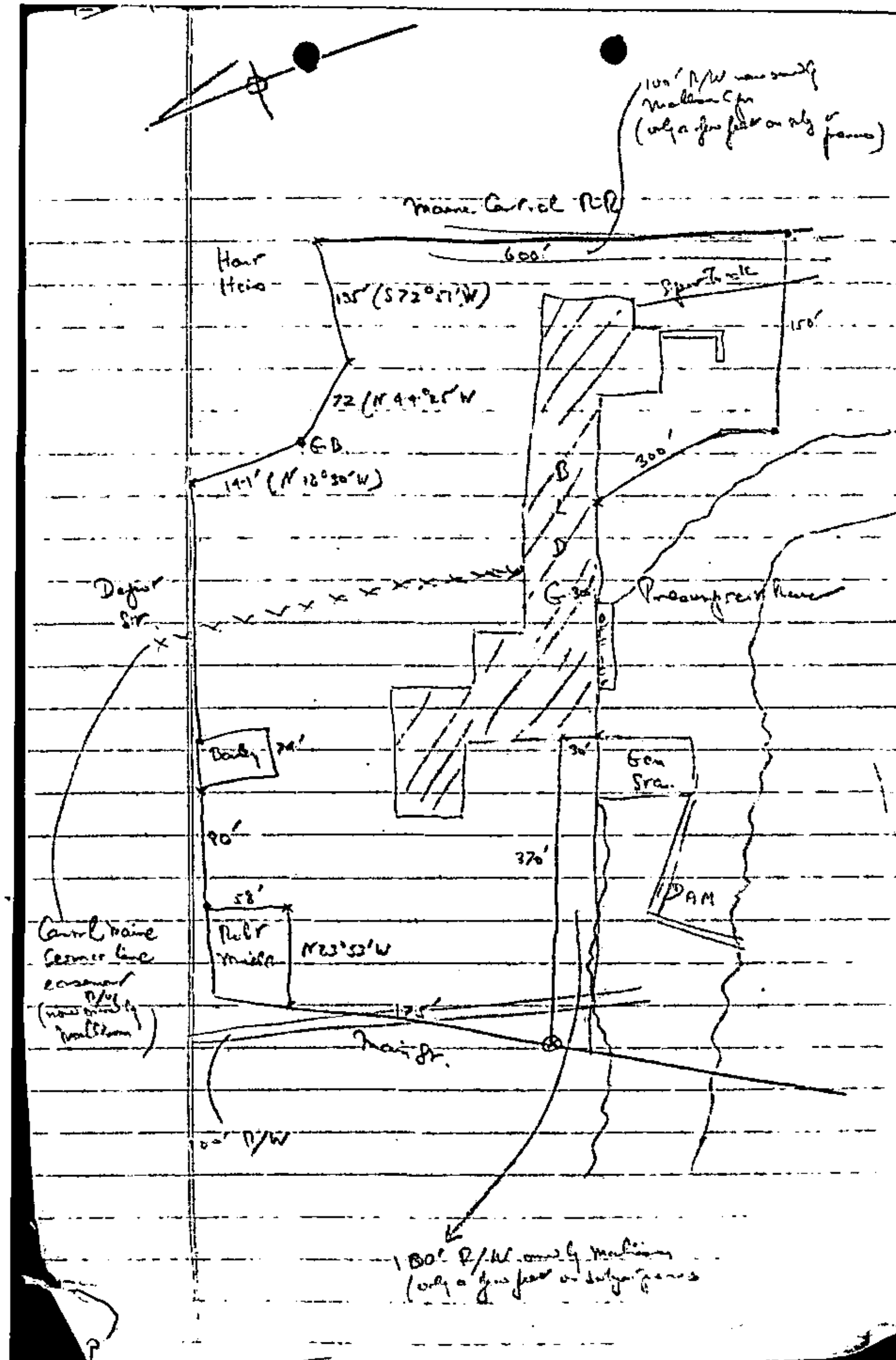
I am enclosing a copy of the proposed deed. The application to Lawyers Title Insurance Corporation was sent off today with instructions for the binder to be sent to you. If you have any questions, please feel free to write or call.

Sincerely yours,

Louis A. Wood

LAW/pr

Enc.



600'
135' (S72°57'W)
150'
72 (N44°25'W
G.D.
141' (N12°30'W)
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90'
370'
DAM
58'
N23°53'W
175'

SAMUEL M. KLIVANSKY
ATTORNEY AT LAW

23 CENTRAL AVENUE
SECURITY TRUST BUILDING
LYNN, MASS.

LYNN 5-4199

June 6, 1961

Attorney's Certificate

Keddy Manufacturing Co.
Birch Road
Middleton, Mass.

Gentlemen:

Whereas on June 6, 1961, the following transactions are to be consummated, namely:

1. Keddy Manufacturing Corporation to Keddy Manufacturing Co.
   Sale of all automobiles, chattels, inventory, office equipment and furniture, good will etc.-all personal property and tangible and intangible assets except cash, accounts receivable and corporate records.
2. Abbott Steel Corporation to Keddy Manufacturing Co.
   Sale of all machinery and equipment-being all personal property and tangible and intangible assets except cash, accounts receivable and corporate records.
3. Cumberland Manufacturing Corporation to Keddy Manufacturing Co.
   Sale of all machinery, equipment-being all personal property and tangible and intangible assets, except cash, accounts receivable and corporate records.
4. Atlantic Mills Inc. to Keddy Manufacturing Co.
   Real Estate including land and buildings as set forth in plan prepared by office of Edward Dana, Esq. or Portland, Me.

(See exceptions noted on reverse side)

Now therefore, I, Samuel M. Klivansky as Attorney for said Keddy Manufacturing Corporation, Abbott Steel Corporation, Cumberland Manufacturing Corporation and Atlantic Mills Inc, do hereby state and affirm that in my opinion the title to all the tangible and intangible assets and personal property being sold and transferred to Keddy Manufacturing Co. by the respective corporations set forth above is clear and unencumbered.

In addition, I, Samuel M. Klivansky, Attorney, hereby certify that I have examined the corporate records of all the following corporations:

Keddy Manufacturing Corporation
Abbott Steel Corporation
Cumberland Manufacturing Corporation
Atlantic Mills Inc.

and that at legally scheduled meetings of said corporations, resolutions were adopted in proper form and in accordance with the charters, by-laws and applicable laws: said resolutions authorizing the sale by the respective corporations of tangible and intangible property to Keddy Manufacturing Co.

Samuel M. Klivansky

Reservations from Sale:

At Middleton an uninstalled Diesel engine with equipment and certain hydraulic turbine parts.

At Windham parts of an Ingersoll-Rand compressor, a 20,000-lb. unassembled Massey-Harris forging hammer and certain hydraulic turbine parts.

Samuel M. Vauclain

Hold for signature
with Davis

June 6, 1961

Keddy Manufacturing Co.
South Windham
Maine

Gentlemen:

This will evidence our understanding that so long as our facilities enable us to supply your demands and so long as you desire to purchase the same from us we will supply your power demand at your South Windham Plant at Central Maine Power Company current published "K" rates less 25%.

Very truly yours,

MALLISON CORPORATION

By_____

Accepted:

KEDDY MANUFACTURING CO.

By_____

June 6, 1961

Louis A. Wood, Esquire
Verrill Dana Walker Philbrick & Whitehouse
57 Exchange Street
Portland, Maine

Dear Sir:

Herewith is deed to this Company from Atlantic Mills, Inc. of premises in South Windham, Maine, and discharge of mortgage thereon by Commercial Credit Corporation, together with check of Choate, Hall & Stuart to the order of Atlantic Mills, Inc. for $4142.29

When you are prepared to issue us Lawyers Title Insurance Company Title Policy insuring good title, free of encumbrances, in accordance with Interim Title Binder dated ~~June~~ May 31, 1961, you are authorized to record the enclosed instruments and to deliver the enclosed check to Atlantic Mills, Inc.

Prorations of taxes and insurance ~~and revenue stamps~~ have been adjusted between buyer and seller.

Kindly bill us for ~~revenue stamps~~, recording fees and premium for title insurance.

Please have the recorded instruments returned to us.

Very truly yours,

KEDDY MANUFACTURING CO.

By_____

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNITHEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE, 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO—

June 9, 1961

Harold Mitherz, Esquire
Tanzer, Mullaney, Mithers & Pratt
165 Broadway
New York 6, New York

Dear Mr. Mitherz:

Ace Investment Company has subscribed for all of the stock of Keddy Manufacturing Co. for $1,000. To accomplish this Grinnell advanced Ace against Ace's non-interest bearing demand note (which we have) for $1,000.

To complete the purchase Keddy Manufacturing Co. was organized to make and to provide it with $100,000 working capital Grinnell advanced to it for the account of Ace a total of $1,326,775.52. This represented an advance by Ace to Keddy Manufacturing Co. of this amount. I enclose for the treasury of Ace four demand notes, without interest, of Keddy Manufacturing Co. payable to the order of Ace, all dated the day of acquisition (June 6) except one for $75,000 representing a down payment made on May 26.

To evidence advance to Ace by Grinnell to enable Ace to make the above advances to Keddy Manufacturing Co., I enclose four notes for the same amounts to be executed by Ace to the order of Grinnell and returned to me.

Kindly make the appropriate entries on the books of Ace.

Very truly yours,

GRINNELL CORPORATION

HTC:W

Roger T. Clapp, Counsel

cc-CHR

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO

June 8, 1961

Claude R. Branch, Esquire
Choate, Hall & Stewart
30 State Street
Boston 9, Massachusetts

Dear Claude:

Regarding completion of the real estate acquisitions by Keddy Manufacturing Co., I would appreciate your handling these as follows:

1. Maine Real Estate.

Forward the deed from Atlantic Mills, Inc. and the releases of the Maine real estate and chattel mortgages (when received by you in proper form) to Verrill Dana Walker Philbrick & Whitehouse, 57 Exchange Street, Portland, Maine, attention Mr. Louis Wood, together with your firm check to Atlantic Mills, Inc. for $4,129.29. You can advise them that stamp taxes and prorations of real estate taxes and insurance have been adjusted direct between buyer and seller. They also want a copy of the authorizing vote of Atlantic Mills, Inc., which Mr. Klivansky can give you.

When all items are recorded and Title Policy issuable I suggest that you have them send the Policy to you and authorize them to send the Atlantic Mills check to Mr. Klivansky, unless he prefers it be sent to Mr. Keddy.

Title Binder (which I have approved as to exceptions) is dated May 31, 1961.

I enclose bill of Lawyers Title for Interim Binder for $177.50. I suggest you ask Mr. Klivansky to get you a Keddy Manufacturing Co. check for this.

I suggest you ask Verrill Dana to bill Keddy Manufacturing Co. for recording fees.

Claude R. Branch, Esquire June 8, 1961

2. Massachusetts Real Estate.

Forward the deed from Lawrence Keddy and the mortgage releases (when received in proper form) and the plat (endorsed by the Planning Commission) to Parsons, Arnold & Morgan, 23 Central Avenue, Lynn, Massachusetts, attention Mr. Cedric L. Arnold, with your firm check for $10,000 to Lawrence Keddy. You can advise them that stamp taxes and prorations of real estate taxes and insurance have been adjusted direct between buyer and seller.

When all items are recorded and Title Policy issuable I suggest that you have them send the Policy to you and authorize them to send the $10,000 check to Mr. Klivansky, unless he prefers it be sent direct to Mr. Keddy.

I have no Title Binder but am relying on Mr. Arnold's letter to me of June 5, 1961 as to clear title.

I suggest you ask Mr. Arnold to have Keddy Manufacturing Co. billed for title charges as well as recording fees and Massachusetts documentary stamps.

If I have forgotten anything, or if you have any questions, please call me.

Very truly yours,

RTC:W

Roger T. Clapp, Counsel

TANZER, MULLANEY, MITHERZ & PRATT
COUNSELORS AT LAW
165 BROADWAY
NEW YORK 6, N.Y.

LAURENCE ARNOLD TANZER
EUGENE L. MULLANEY
HAROLD MITHERZ
HOWARD A. PRATT

CORTLANDT 7-2810

June 9, 1961

Mr. Roger T. Clapp
Grinnell Corporation
Providence 1, Rhode Island

Dear Mr. Clapp:

The change of name has been accomplished to Keddy Manufacturing Co. Similarly, the company has been qualified in Massachusetts and Maine.

As soon as you advise concerning the Ace note, I will forward it. At the same time, I will issue the certificate for 100 shares of Keddy in the name of Ace and forward the corporate records.

The corporate minute book will contain directors' minutes electing the final officers and directors, as indicated in your June 2 letter.

Very truly yours,

Harold Mitherz

June 15, 1961.

Louis Wood, Esquire,
57 Exchange Street,
Portland, Maine.

Dear Mr. Wood: Re: <u>Reddy Manufacturing Co.</u>

I enclose herewith deed from Atlantic Mills, Inc. to Reddy Manufacturing Co. and

Discharge by Albert Shore of mortgage recorded with Registry of Deeds, Cumberland County, Maine, Book 2468, page 162.

Discharge by Albert Shore of mortgage of personal property recorded in Clerk's Office, Windham, Maine, Book 3, Vol. 27, page 159.

Discharge by Albert Shore of mortgage recorded in Clerk's Office, Gorham, Maine, Book 42, page 155.

Discharge by Albert Shore of mortgage of personal property recorded in Clerk's Office, Windham, Maine, Book 3, page 158, Vol. 27.

Discharge by Albert Shore of mortgage of personal property recorded in Registry of Deeds, Cumberland County, Maine, Book 2468, page 167.

Check of our firm to Atlantic Mills, Inc. for $4,129.19.

Certified copies of powers of attorney of Albert Shore to Bernard L. Abedon.

I am asking Mr. Alivansky to send you a copy of the vote authorizing the execution of the deed, which I suppose you will want to record with the deed. When all of these instruments have been recorded and the title

Louis Reed, Esquire, -2- June 19, 1961.

policy is issued, will you please send the policy to me and send the check to Mr. Lawrence Reddy, Birch Road, Middleton, Massachusetts.

Steam taxes and proration of real estate taxes and insurance have been adjusted direct between buyer and seller.

I suggest that you bill Reddy Lawrence Co. for recording fees.

Yours truly,

CLAUDE R. BRANDH

CRBhjl

Enclosures
cc. Robert P. Clapp, Esquire

June 15, 1962.

Mr. James P. Kivensky,
83 Central Street,
Lynn, Massachusetts.

Dear Mr. Kivensky:

Confirming my telephone conversation with you, I understand that you will send to Mr. Louis Wood certificate of vote of directors and stockholders of Atlantic Mills, Inc. authorizing Mr. Keddy to execute the deed to Keddy Manufacturing Co. and that you will send check payable to Lawyers Title Insurance Corporation for $177.50 for bill for the interim binder to me.

I also understand that you prefer that when the transactions are closed, I check to Atlantic Mills, Inc. for $4129.29 and the check to Laurence Keddy for $10,000 will be sent direct to Laurence Keddy, Birch Road, Middleton, Massachusetts.

Thanking you again for your cooperation, I am

Sincerely yours,

CLAUDE R. BRANCH

CRB:jh

P. S. The address of Mr. Louis Wood, Esquire, is 59 Exchange Street, Portland, Maine.

June 19, 1961

Grinnell Company
West Exchange Street
Providence, Rhode Island

Attention: Mr. Arthur Davies - - PERSONAL

Gentlemen:

Prior to Grinnell's purchasing certain assets, you and other officials spent several days examining land, buildings, machinery, inventory, processes and every detail of our business. You then made an offer to purchase. Three weeks later, we negotiated most of the differences in Mr. Fleming's office. Grinnell then made a detailed, written proposal and down payment, which we accepted on May 26th. Mr. Clapp efficiently prepared all of the papers for the final closing, and instructed us to notify our secured creditors to be at Choate, Hall and Stewart on June 6th with discharges and releases. We sent telegrams terminating our financing arrangements with Commercial Credit Corporation of New York and Tremont Financing Company of Providence, R. I.

Although Grinnell had studied our assets for several weeks, and had signed a legally enforcible contract, nevertheless, within twenty-four (24) hours of the closing time for the passing of the final papers, you called and said Mr. Risen and Mr. Hart were on their way to my plant to check for inventory over ninety days old. As we explained in great detail the desirability of the entire inventory, notwithstanding the same, Mr. Risen and Mr. Hart worked diligently late into the night compiling the list of every item that they felt was undesirable.

The closing was to have taken place at ten A. M. At 12 o'clock, Mr. Risen called and said they had compiled a detailed list of items totalling $156,800.00 which they were not going to purchase.

Regardless of your written commitments, and since I had terminated my major creditors for sums in excess of half a million dollars and they were waiting in Boston to be paid off, together with other irreversible commitments that I had made, I had no alternative in order to fulfill our agreement but to agree that Grinnell would not have to purchase any inventory that they did not desire. An amendment was made to the contract in Boston. I could not understand why you broke your contract and rejected part of the inventory until I received your call and offer to purchase the same inventory, one week after the closing, for approximately half price, together with a so-called "suggestion" stating that if I did not sell to you I might violate the terms of my employment contract.

When your Company rejected and made me retain $156,800.00 of inventory, you did so with the full knowledge of the complications involved. Our agreement states that I shall not compete. It also states that I shall liquidate the company which owns the inventory as expeditiously as possible. In order to liquidate a company, you must first dispose of all the assets, including inventory. Such a liquidation which was forced by your inventory refusal is not the same as competing with you in business and is not a violation of the contract.

I am not interested in your offer, and we are proceeding to remove the inventory as stipulated in the amendment. I will dispose of the inventory to my

best advantage, and expect to realize at least $156,000.00. I do not want or expect any interference from Grinnell, whatsoever, for, if you had any restrictions as to the inventory disposal, the time and place to have inserted them was when your lawyers wrote the amendment covering the $156,000.00 of inventory. I have not let this contract breach and forced amendment dampen my enthusiam or effort to manage your company as you desire, and my present plans are not to dispose of the inventory at this time, since all of my present efforts are to complete some cost-cutting processes that I am working on for you, and other managerial duties resulting from the formation of your new company.

Incidentally, I would like to bring to your attention the fact that my inventory could not be removed from the premises, which were sold to you, immediately, due to the bulky nature of the same and the fact that I was tied up on other matters in your behalf. During that time, and to date, I have had to draw on certain of my inventory, in order to fill your customer's orders on items that you did not have on hand and which you could not supply.

I will, under separate cover, send you a bill for these items based on the price of our original contract. In the meantime, I am in the process of having the remainder of my inventory removed from your premises.

I hope this proceedure meets with your approval, since it is solely for your benefit. However, if you have a difference of opinion, please notify me immediately.

Yours very truly,

Lawrence J. Keddy

LAWRENCE J. KEDDY

TANZER, MULLANEY, MITHERZ & PRATT
COUNSELORS AT LAW
165 BROADWAY
NEW YORK 6, N.Y.

LAURENCE ARNOLD TANZER
EUGENE L. MULLANEY
HAROLD MITHERZ
HOWARD A. PRATT

CORTLANDT 7-2810

June 19, 1961

Mr. Roger T. Clapp
Grinnell Corporation
Providence 1, Rhode Island

Dear Mr. Clapp:

Receipt is acknowledged of your letter of June 9, 1961, and its contents have been properly noted.

The certificate for 100 shares of Keddy Manufacturing Co. has been issued in the name of Ace, which we are holding as counsel for Ace.

Under separate cover I have sent you the original minute book of Keddy. In that connection, the new directors should sign the last minutes, where indicated in the minute book.

This completes the matter save for the promissory notes, which I will attend to upon receiving your advice thereon.

Very truly yours,

Harold Mitherz

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO—

June 20, 1961

Harold Mitherz, Esquire
Tanzer, Mullaney, Mitherz & Pratt
165 Broadway
New York 6, New York

Dear Mr. Mitherz:

I have your letter of June 19, and have received the original Minute Book of Keddy Manufacturing Co.

I am not sure I understand the last sentence of your letter. In my letter of June 9, I enclosed the four Keddy Manufacturing Co. notes to the order of Ace to be held by you for the account of Ace, as well as four notes for the same amounts to the order of Grinnell to be signed by Ace and to be returned to me.

Yours very truly,

RTC:W

Roger T. Clapp, Counsel

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO

June 20, 1961

PERSONAL

Mr. Lawrence J. Keddy
C/o Keddy Manufacturing Corporation
Middleton, Massachusetts

Dear Mr. Keddy:

Mr. Davies has asked me to reply to your letter to him of June 19 regarding the non-current inventory.

We categorically deny any breach of contract on our part. While I was not present at that stage of the negotiations with you, Mr. Fleming and Mr. Davies clearly recollect that you represented to them that your inventory was all current (meaning, as it is understood in the trade, not over 90 days old) and that you added that if it were not current you could not borrow on it.

Mr. Rison and Mr. Hart in the process of supervising the taking of inventory discovered that a substantial portion of the same was not current, and so reported to Providence.

I then advised that this material misrepresentation was sufficient in my opinion to warrant our declining to complete the transaction, at least until this matter could be disposed of. Based on Mr. Rison's statements as to the time that would be necessary to determine what was involved, I further recommended that the closing be postponed and so notified Mr. Klivansky by telephone. On the scheduled day for the closing I did, however, go to Boston on the off-chance that this matter could be settled, largely because of Mr. Klivansky's statement that he questioned whether he could recall the notices to the two secured creditors and was very concerned as to their attitude if the closing were deferred.

In the meantime Mr. Rison informed you as to the above and asked what you had to suggest. According to him, it was your suggestion that the non-current inventory be

excluded, which we accepted. He and Mr. Hart then proceeded to work practically around the clock to determine the amount of the exclusion and I prepared an amendment to the agreement to cover this which both of us signed.

As to your specific questions:

1. We agree that the non-current inventory belongs to the companies owning the same.

2. We agree that your right to liquidate the same is necessarily an implied exception to your agreement not to compete, but we will expect you to observe the spirit of that agreement by using every effort to liquidate the same as expeditiously as possible and in such manner as to have the least competitive effect on the new Keddy Manufacturing Co.

3. To the extent you have used any of such non-current inventory in filling orders on Keddy Manufacturing Co., that company will accept invoices for the same at the price it would have paid had such items been included in the inventory purchased at closing.

Very truly yours,

RTC:W Roger T. Clapp, Counsel

cc-JDF
CHR
ARD

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.
PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO

June 26, 1961

PERSONAL

Mr. Lawrence J. Keddy
C/o Keddy Manufacturing Corporation
Middleton, Massachusetts

Dear Mr. Keddy:

I refer further to your letter of June 19 to Mr. Davies and my reply of June 20.

Referring to the last paragraph (numbered 3) of my letter, in our agreeing to accept invoices for items on your non-current inventory used to fill orders on Keddy Manufacturing Co. this was limited to cases where you had so used your inventory as indicated in the third paragraph from the end of your letter. We are not prepared to purchase from you any of such items so used after June 30, 1961 for the purpose of filling orders on Keddy Manufacturing Co.

As to the statement in your letter that you are in process of removing the remainder of your inventory from Keddy Manufacturing Co. premises, your agreement with us called for such inventory to be removed "promptly". Confirming Mr. Davies' statement to you today, we must insist that all of your inventory must be removed from the main building of the Middleton plant by June 30 and all of the same must be removed from both the Middleton and South Windham plant premises by July 31.

Very truly yours,

RPC:W

Roger T. Clapp, Counsel

cc-JDP
CHR
ARD

CLAUDE R. BRANCH
ATTORNEY AT LAW
PROVIDENCE WASHINGTON BUILDING
20 WASHINGTON PLACE
PROVIDENCE 1, R. I.

TELEPHONE
TEMPLE 1-4014

June 27, 1961

Louis Alfred Wood, Esq.,
Verrill Dana Walker Philbrick & Whitehouse,
57 Exchange Street
Portland, Maine.

Dear Mr. Wood:

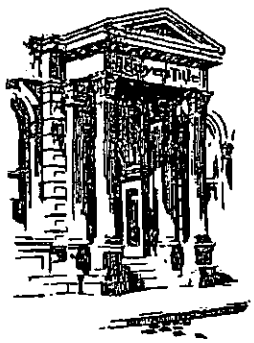
I enclose herewith two acknowledgments by Albert Shore d/b/a Tremont Finance Co. of satisfaction of mortgages, recorded in Cumberland County Registry of Deeds, Book 2468, Pages 102 and 107, executed before me as notary public. As you will see, I have affixed my notarial seal. Will you please let me know what, if anything, more you wish?

Yours sincerely,

CRB/vrb
Enc.

CLAUDE R. BRANCH

Form 90-35



Lawyers Title Insurance Corporation

Box 6-J
Richmond 15, Virginia
May 31, 1961

ACCOUNT WITH

Messrs. Verrill, Dana, Walker,
Philbrick and Whitehouse
Attorneys at Law
57 Exchange Street
Portland, Maine

Please Receipt and Return to
Claude R. Branch
30 State St., Boston, Mass.

TO - Issuance of Interim Binder for $50,000.00 Owner's Policy $177.50

RE - Purchase of property in Town of Windham, Cumberland County, Maine, by Keddy Manufacturing Co., a corporation.

KINDLY RETURN THIS INVOICE WITH YOUR REMITTANCE

VERRILL DANA WALKER PHILBRICK & WHITEHOUSE
ATTORNEYS AT LAW
57 EXCHANGE STREET
PORTLAND, MAINE

HARRY MICHELS VERRILL
JOHN FESSENDEN DANA
LEON VALENTINE WALKER
DONALD WARD PHILBRICK
ROBINSON VERRILL
BROOKS WHITEHOUSE
EDWARD FOX DANA
DONALD LOCKEY PHILBRICK
ROGER ASHURST PUTNAM
ROBERT B WILLIAMSON JR
JOHN ALBERT MITCHELL
LOUIS ALFRED WOOD

TELEPHONE
SPRUCE 4-4573

July 17, 1961

Claude E. Branch, Esq.
20 Washington Place
Providence, Rhode Island

Dear Mr. Branch:

Re: Keddy Manufacturing Co. Purchase of
South Windham, Maine Property

Enclosed please find the title policy for $50,000 issued by Lawyers Title Insurance Corporation and also the deed from Atlantic Mills, Inc. to Keddy Manufacturing Co. duly recorded.

I am mailing the check for $4141.29 to Laurence Keddy, Birch Road, Middleton, Massachusetts, today. Mr. Klivansky called me Friday with reference to the corporate authorization of Atlantic Mills, Inc. I verified to him that I had received such authorization from him. His records did not show that he had sent the authorization.

I am enclosing our bill for professional services and disbursements. If you have any questions or you require additional information regarding the situation, please let me know.

The discharges have not, as yet, been returned to me from the Registry of Deeds, and when they are returned, I shall forward them on to you.

Sincerely yours,

LAW/pc

Enclosures

CLAUDE R. BRANCH
ATTORNEY AT LAW
PROVIDENCE WASHINGTON BUILDING
20 WASHINGTON PLACE
PROVIDENCE 1, R. I.

TELEPHONE
TEMPLE 1-4014

July 25, 1961

Roger T. Clapp, Esq.,
Grinnell Corporation,
260 W. Exchange Street,
Providence, Rhode Island.

Dear Roger:

I enclose herewith the following:

Copy of a letter from Louis Wood to me dated July 17th.

Bill of his firm to Keddy Manufacturing Co.

Deed from Atlantic Mills, Inc. to Keddy Manufacturing Co.

Policy of Title Insurance on land at Windham, Maine.

I have not examined the Title Insurance Policy to see whether it is in proper form, but assume that you will have someone do so.

I understand that you will attend to payment of the enclosed bill.

If you wish me to do anything more in these matters, will you please let me know.

Yours sincerely,

Claude

CRB/vrb
Enc.

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR-CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE 1, R. I.

PROVIDENCE 1, R. I.

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO

September 7, 1961

Eugene L. Mullaney, Esquire
Tanzer, Mullaney, Mitherz & Pratt
165 Broadway
New York 6, New York

Dear Gene:

We want to hold a special stockholders' meeting of Keddy Manufacturing Co. to ratify certain actions of the officers.

Kindly execute the enclosed proxy (copy enclosed for your files) and mail it direct to Mr. Branch in the enclosed stamped addressed envelope.

Regards.

Yours very truly,

HTC:W

Roger T. Clapp, Counsel

P R O X Y

Ace Investment Company, sole stockholder of Keddy Manufacturing Co., a Delaware corporation, hereby appoints Claude B. Branch, of Boston, Massachusetts, its proxy to vote all of its stock in said Company at a special meeting of the stockholders of said Company to be held at 30 State Street, Boston, Massachusetts, on September , 1961, and hereby waives all further notice of the time, place or purposes of said meeting.

Dated September , 1961.

ACE INVESTMENT COMPANY

By

MINUTES of a Special Meeting of the stockholders of KEDDY MANUFACTURING CO., held at the office of Claude R. Branch, 30 State Street, Boston, Massachusetts, on the 20th day of September, 1961, at 10:30 o'clock in the morning, D. S. T.

PRESENT:

LAWRENCE KEDDY
HOWARD A. WAITT
CLAUDE R. BRANCH

constituting a quorum.

Mr. Branch presented a proxy from Ace Investment Company, sole stockholder, authorizing him to vote all of its stock at a special meeting of the stockholders of the company to be held on this day and waiving all notice of the time, place, or purposes of the meeting.

Mr. Keddy, the president, presided and Mr. Waitt, the secretary, acted as such.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the acts of any of the present officers of the corporation in acquiring real estate, tangible personal property, and intangible personal property from Lawrence Keddy, Keddy Manufacturing Corporation, Abbott Steel Corporation, Cumberland Manufacturing Corporation and Atlantic Mills, Incorporated, and in executing notes and other instruments in connection therewith in behalf of the corporation in which they purported to act as officers of the corporation and bind

the corporation before they became officers thereof be and they hereby are ratified and confirmed and said officers be and they hereby are absolved from any personal liability on account of such acts, and all of said notes and other instruments be and they hereby are made liabilities of the corporation and of no individuals.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the acts on August 18, 1961, of Lawrence Keddy, as President of the corporation, in acquiring real estate from Lawrence Keddy and personal property from Keddy Manufacturing Corporation and in executing an agreement and release to which the parties were Lawrence Keddy, individually, Keddy Manufacturing Corporation, Abbott Steel Corporation, Cumberland Manufacturing Corporation, Atlantic Mills, Inc., Grinnell Corporation, and Keddy Manufacturing Co., be and they hereby are ratified and confirmed.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the act of the president in executing a note for $150,000, without interest, to the order of the Ace Investment Company, payable on demand at 165 Broadway, New York, New York, upon receipt of said sum be and it hereby is ratified and confirmed.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That Lawrence Keddy, as president and treasurer of the corporation, be and he hereby is authorized to borrow in behalf of the corporation $50,000 from Ace Investment Company and in consideration of the receipt of such sum to execute a note for $50,000, without interest, to the order of Ace Investment Company, payable on demand at 165 Broadway, New York, New York.

There being no further business to come before the meeting, the same was adjourned.

Howard A. Wolff
Secretary

MINUTES of a Special Meeting of the Board of Directors of KEDDY MANUFACTURING CO., held at the office of Claude R. Branch, 30 State Street, Boston, Massachusetts, on the 23rd day of August, 1961, at 3:15 o'clock in the afternoon, D. S. T.

PRESENT:

LAWRENCE KEDDY
HOWARD A. WAITT
CLAUDE R. BRANCH

constituting a quorum.

Mr. Keddy, the president, presided and Mr. Waitt, the secretary, acted as such.

The Secretary then presented and read to the meeting a waiver of notice of the time, place and purpose of the meeting, subscribed by all of the directors, and the same was ordered attached to the minutes of this meeting.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the acts of any of the present officers of the corporation in acquiring real estate, tangible personal property, and intangible personal property from Lawrence Keddy, Keddy Manufacturing Corporation, Abbott Steel Corporation, Cumberland Manufacturing Corporation and Atlantic Mills, Incorporated, and in executing notes and other instruments in connection therewith in behalf of the corporation in which they

purported to act as officers of the corporation and bind the corporation before they became officers thereof be and they hereby are ratified and confirmed and said officers be and they hereby are absolved from any personal liability on account of such acts and all of said notes and other instruments be and they hereby are made liabilities of the corporation and of no individuals.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the corporation borrow $150,000 from Ace Investment Company and that the President be and he hereby is authorized in consideration of the receipt of such sum to execute a note for $150,000, without interest, to the order of Ace Investment Company, payable on demand at 165 Broadway, New York, New York.

Upon motion duly made, seconded and carried, Mr. Keddy not voting, it was unanimously

RESOLVED, That the acts on August 18, 1961, of Lawrence Keddy, as President of the corporation, in acquiring real estate from Lawrence Keddy and personal property from Keddy Manufacturing Corporation and in executing an agreement and release be and they hereby are ratified and confirmed.

There being no further business to come before the meeting, the same was adjourned.

_____
Secretary

MINUTES of a Regular Meeting of the Stockholders of KEDDY MANUFACTURING CO., held at the office of Claude R. Branch, 30 State Street, Boston, Massachusetts, on the 28th day of May, 1962, at 11:00 o'clock in the morning, D. S. T.

PRESENT:

HOWARD A. WAITT
CLAUDE R. BRANCH

constituting a quorum.

Mr. Branch presented a proxy from Ace Investment Company, sole stockholder, authorizing him as its true and lawful attorney and agent for it, and in its name, place and stead, to vote as its proxy at the Annual Meeting of Stockholders of the Company, to be held on May 28, 1962.

In the absence of the President Mr. Branch presided and Mr. Waitt, the secretary, acted as such.

The minutes of the Special Meeting of the stockholders held on September 20, 1961, were read and without objection were approved.

Upon motion duly made, seconded and carried, it was unanimously

RESOLVED, That the acts of the President in executing notes for the following sums, upon receipt of such sums, payable on demand to the order of Ace Investment Company, at 165 Broadway, New York, N. Y., are hereby ratified and confirmed:

September 14, 1961	-	$50,000
November 29, 1961	-	50,000
January 2, 1962	-	75,000
February 8, 1962	-	50,000

March 6, 1962 - $75,000

April 10, 1962 - 100,000

May 18, 1962 - 75,000

There being no further business to come before the meeting, the same was adjourned.

Secretary

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

EXECUTIVE OFFICES PROVIDENCE, R. I.
260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

FIRE PITTSBURG AND VALVES
PLUMBING AND HEATING MATERIALS
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO

June 14, 1965

Claude R. Branch, Esquire
Choate, Hall & Stewart
30 State Street
Boston, Massachusetts 02109

Dear Claude:

I enclose copy of an agreement between Keddy Manufacturing Co. and Keddy personally to buy some equipment he owns, the form of which agreement was agreed upon with Keddy.

Since Keddy is on both sides of this, he would like to have a directors' vote approving this purchase by the Company.

Could you arrange for a meeting to adopt an appropriate vote? At the same time, it is in order to hold the annual meeting and organization meeting of the Company, re-electing the present directors and officers.

You may accept this letter as appointing you our proxy for the annual meeting.

I would appreciate the return of the enclosed as it is my file copy.

Very truly yours,

Roger T. Clapp
Secretary and Counsel

RTC:W

MINUTES of a Special Meeting of the stockholders of KEDDY MANUFACTURING CO., held at the office of Claude R. Branch, 30 State Street, Boston, Massachusetts, on the 23rd day of June, 1965, at 11 o'clock in the morning, D. S. T.

PRESENT:

Lawrence J. Keddy
Howard A. Waitt, and
Claude R. Branch

constituting a quorum.

Mr. Branch presented a proxy from Ace Investment Company, sole stockholder, authorizing him as its true and lawful attorney and agent for it, and in its name, place and stead, to vote as its proxy at Special Meeting of stockholders of the company, to be held on June 23, 1965.

Mr. Keddy, the President, presided, and Mr. Waitt, the Secretary, acted as such.

The minutes of the Special Meeting of the stockholders held on May 28, 1962 were read and without objection were approved.

Upon motion duly made and seconded, it was unanimously

RESOLVED, That the act of the President in executing a conditional sale agreement between Keddy Manufactuing Co. and Lawrence J. Keddy individually, dated June 18, 1965, (of which a duplicate original was presented to the meeting, which is attached to these minutes) be and it hereby is ratified and confirmed.

Upon motion duly made and seconded, it was unanimously

RESOLVED, That the acts of the President in executing notes for the following sums, upon receipt of such sums, payable on demand to the order of Ace Investment Company, at 165 Broadway, New York, N. Y., are hereby ratified and confirmed:

June 18, 1962	- $100,000
August 20, 1962	- $ 75,000
September 11, 1962	- $100,000
October 5, 1962	- $100,000
December 17, 1962	- $100,000
February 1, 1965	- $ 75,000
February 26, 1965	- $ 50,000

Upon motions duly made and seconded, the following directors were elected to serve until the next annual meeting of stockholders in May 1966:

Lawrence J. Keddy
Howard A. Waitt
Claude R. Branch

There being no further business to come before the meeting, the same was adjourned.

_____
Secretary

CONDITIONAL SALE AGREEMENT

LAWRENCE J. KEDDY of Middleton, Massachusetts (Seller), hereby sells to KEDDY MANUFACTURING CO., a Delaware corporation (Buyer), the following equipment located on the premises of the plant of Buyer in Windham, Maine:

One 1942 Massey 20,000-lb. forging hammer
(detailed specifications attached)

One 8300 CFM Ingersoll-Rand air compressor
with 1450 HP General Electric motor
(detailed specifications attached)

for a total price of $47,795 payable in 47 equal successive monthly payments of $1,000 each commencing June 1, 1965 and a final 48th payment of $795, plus, in the case of each such monthly payment, interest at the rate of 4% per annum on the unpaid balance of said price from the date of the next preceding payment.

Buyer reserves the right at any time to pay the entire unpaid balance of said price without interest except from the date of the next preceding monthly payment.

Seller warrants that he has sole and unencumbered title to all of said equipment.

Seller warrants that the use by Buyer of the said Ingersoll-Rand air compressor to operate the forging hammers in place of steam will result in a cost saving of at least 10% comparing the cost of the electricity for the compressor against the cost of Bunker C Oil used to produce the steam used in the forging hammers. If, in the Purchaser's opinion, such minimum savings is not obtained, the Seller will, at his own expense, remove the air compressor and refund all payments of principal and interest made to date on the compressor.

Seller warrants said equipment to be in operative condition and free of defects. If during installation by the purchaser or during the first 60 days of operation, it shall be necessary to repair either or both of said items to cure any such defects, the cost of such repairs shall be credited against the unpaid balance of said price. If at any time, for any reason, the buyer wishes to terminate the Conditional Sale Agreement, he may do so by letter from Messrs. Choate, Hall & Stewart of Boston, Massachusetts, representing the stockholder of buyer. If terminated, the buyer shall be relieved of all further payments hereunder, and forfeits all payments made to date of cancellation. Further, the Buyer agrees that the Seller may store without charge the said equipment at his own risk where located for not over 120 days from date of notice requesting removal.

Seller reserves title to said equipment until said purchase price shall have been paid in full with interest as above provided, at which time full title thereto shall be vested in Buyer.

Dated June 18, 1965.

Executed in duplicate original.

Laurence J. Keddy
Seller

KEDDY MANUFACTURING CO.

By Laurence J. Keddy Pres.
Buyer

20,000 lb. FORGING HAMMER

SPECIFICATIONS

Selling Price $ 60,000.00
(Original cost approx. $250,000.00)

Manufacturer -- Massey

Year -- 1942

Production Usage -- Approx. 2 yrs. during war - idle ever since

Operated by -- Steam or compressed air, 100 PSI

Material and Weights:

Cylinder	-- Steel --	12 1/2	Tons
Side Columns	-- Steel --	63	Tons
Base Plates	-- Steel --	44 1/2	Tons
Ram and Piston	-- Steel --	12 1/2	Tons
Upper Anvil	-- Steel --	65	Tons
Lower Anvil	-- CI --	70	Tons
Tie Bars		2 1/2	Tons
Valvet Guides		2	Tons
Misc.		4	Tons
		270	Tons

The forging hammer is dismantled and each piece is placed within ten feet of a railroad siding.

Transportation will be furnished for inspection from Boston, Massachusetts

For added information or discussion please call:

KEDDY MANUFACTURING CO.
Middleton, Massachusetts

Tel. 617-774-2000

Attention - Mr. Earle F. Keddy

April 19, 1968

Dear Lawrence:

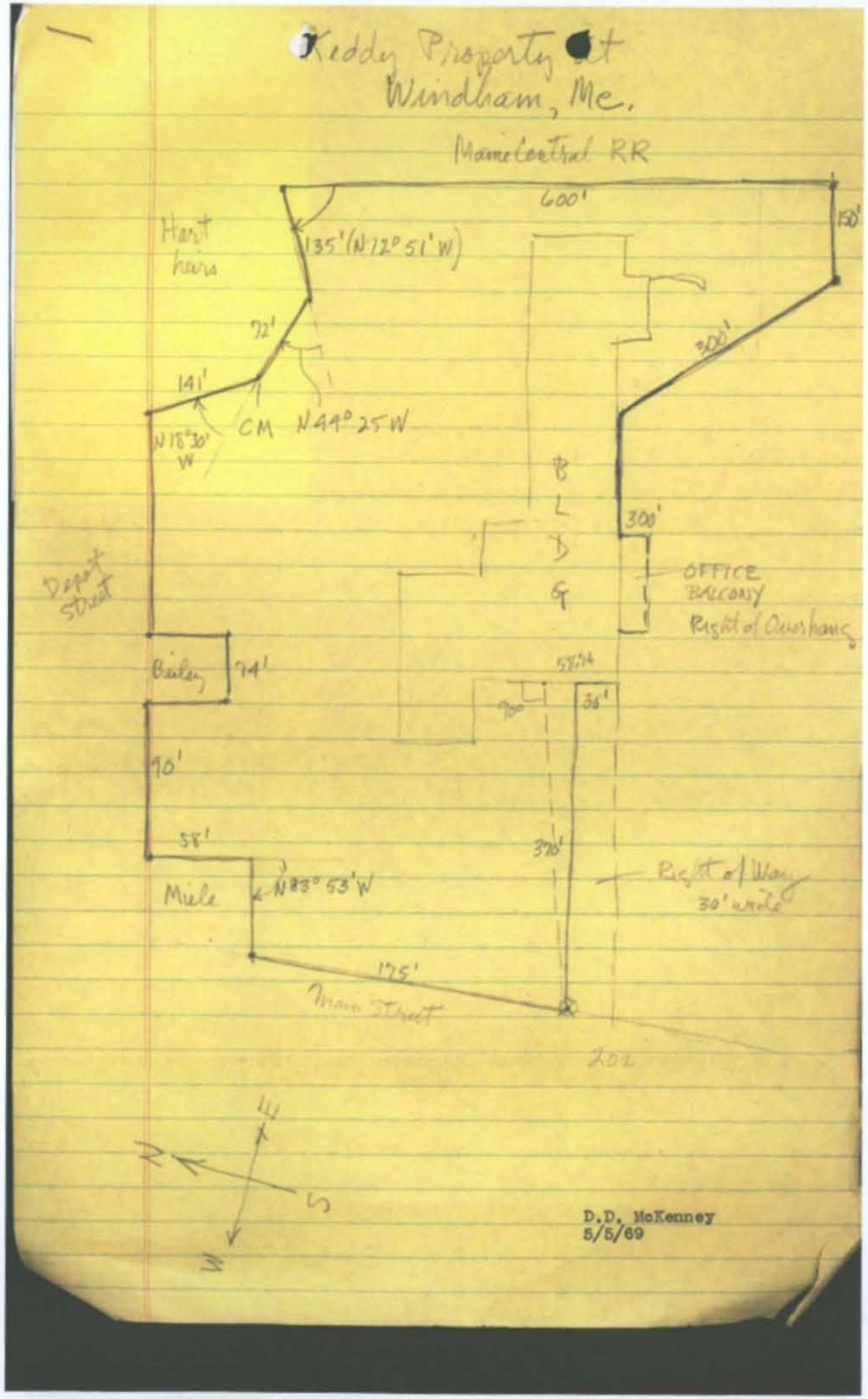
Enclosed are three copies of conditional sale agreement to cover the 1200 KVA motor generator set and 5,000 lb. melting furnace. This agreement has been prepared along the lines of that which covered the 20,000 lb. forging hammer and 8300 CFM air compressor.

It would be appreciated if you would execute two copies of this agreement and return one for our files.

Your co-operation in making this equipment available is sincerely appreciated.

Yours truly,

(This from Mr. Davies' fukes)


Kiddy Property at
Windham, Me.
Maine Central RR
600'
150'
Hart
heirs
135' (N 72° 51' W)
72'
141'
N 18° 30' W
CM
N 44° 25 W
300'
300'
OFFICE
BALCONY
Right of Overhang
Depot
Street
Bailey
74'
58.74
30
36'
90'
58'
N 83° 53' W
Miele
376'
Right of Way
30' wide
175'
Main Street
202
14
D.D. McKenney
5/5/69

3 men
$18/hr.
plus.
Drafting
Time.
$300 - $1000

TOWN OF WINDHAM, MAINE

MUNICIPAL OFFICERS

SOUTH WINDHAM, MAINE
R. F. D. 1

LAWRENCE R. ALLEN
CLYDE S. ESTY, JR.
RICHARD E. BRUME
Selectmen

BARBARA E. STROUT
Collector and Treasurer

BARBARA E. STROUT, Clerk

April 21, 1969

Choate, Hall and Stewart
20 State Street
Boston, Mass

Attention: Claude R. Branch

Dear Sir:

Real Estate taxes due the Town of Windham from

Lawrence A. Reddy: 1967 Damsite 2374.56
1968 Damsite 2679.46
1967 Map 33 Lot7 6443.00

Reddy Manufacturing Co. 1968 Map 33 Lot 7 7211.32.

These amounts do not include interest.

Yours truly,

Barbara E. Strout

Barbara E. Strout
Tax Collector

CHOATE, HALL & STEWART

28 STATE STREET

AREA CODE 617

TELEPHONE 227-5020

CABLE ADDRESS CHOHALSTE

BOSTON, MASS. 02109

April 25, 1969

Mr. David D. McKenney,
Secretary, Grinnell Corporation,
260 West Exchange Street,
Providence, R. I. 02901

Dear Mr. McKenney: Re Keddy Manufacturing Company

I paid $5,612.57 for the Windham, Maine, personal property tax, and have a receipt for the same, which I enclose

I also have a letter from the Tax Collector, of which I enclose a copy. I do not understand the tax on Lot 7 on Map 38 - $7271.32, as that is much more than the amount which was paid.

Yours sincerely,

Claude R. Branch

CRB:dlc

Enclosures

PAYMENT AND ASSIGNMENT

County of New York)
) ss.
State of New York)

KNOW ALL MEN BY THESE PRESENTS, THAT

WHEREAS, all of the members of the Board of Directors of ACE INVESTMENT COMPANY, a corporation organized and existing under the laws of the State of Delaware and hereinafter designated "Ace", by unanimous written consent dated April 29, 1969 and filed with the minutes of Ace, declared a dividend on that date to the stockholder of record on that date of all the shares of stock of Keddy Manufacturing Co., hereinafter designated "Keddy", which stock is owned by Ace and consists of 100 shares of common stock without par value; and

WHEREAS, said consent authorized and empowered the Ace officers to perform any act necessary or proper to effectuate the dividend; and

WHEREAS, GRINNELL CORPORATION, a corporation organized and existing under the laws of the State of Delaware and hereinafter designated "Grinnell", was the sole Ace stockholder of record on April 29, 1969;

NOW THEREFORE, pursuant to said consent Ace, by its President, hereby pays, transfers, assigns, conveys, delivers and sets over to Grinnell the said 100 shares of Keddy stock as a dividend with all the rights, privileges and obligations pertaining thereto.

ACE INVESTMENT COMPANY

By_____
President

On this 29th day of April, 1969, before me personally appeared Eugene L. Mullaney, President of Ace Investment Company, to me known to be the person who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

Notary Public in and for the State of New York, residing in

My commission expires

UNANIMOUS ACTION BY THE BOARD OF DIRECTORS

OF ACE INVESTMENT COMPANY

We, the undersigned, being all the directors of Ace Investment Company, do hereby consent, pursuant to Section 141(f) of the General Corporation Law of the State of Delaware, to the following actions, which actions are required or permitted to be taken without a meeting on written consent of all the directors:

A dividend is hereby declared as of this date to the stockholders of record as of this date of all the shares of stock of Keddy Manufacturing Co. owned by Ace Investment Company, which stock consists of 100 shares of common stock without par value.

The promissory notes made by Keddy Manufacturing Co. to Ace Investment Company totaling $2,782,388.09 are hereby transferred and assigned to the Grinnell Corporation, without recourse, in exchange for the cancellation and discharge by said Grinnell Corporation of certain promissory notes totaling $2,782,388.09 made by Ace Investment Company to Grinnell Corporation.

The officers of Ace Investment Company are hereby authorized,

empowered and instructed to perform any act necessary or proper to effectuate the foregoing.

Dated: April 29, 1969

_____

_____

_____

CONTRIBUTION, DEDICATION AND RELEASE

KNOW ALL MEN BY THESE PRESENTS, THAT Grinnell Corporation, a corporation organized and existing under the laws of the State of Delaware with a principal place of business at Providence, Rhode Island, hereinafter designated "Grinnell", does hereby contribute, dedicate, release and forever quitclaim unto Keddy Manufacturing Co., a corporation organized and existing under the laws of the State of Delaware with a principal place of business at Middleton, Massachusetts, hereinafter designated "Keddy", the sum of $2,782,388.09, the full amount of the indebtness now owing from Keddy to Grinnell, the sum so contributed, dedicated and released to be treated as paid-in capital and surplus of Keddy.

IN WITNESS WHEREOF, said Grinnell has caused its corporate seal to be hereto affixed and these presents to be executed in its name and behalf by Clarence H. Rison, its President, thereunto duly authorized this 29th day of April, 1969.

GRINNELL CORPORATION

By Clarence H. Rison

President

Executed in the presence of:

Robert O'Mc Tierney

TRANSFER AND ASSIGNMENT

County of New York }
State of New York } ss.

April 29, 1969

KNOW ALL MEN BY THESE PRESENTS, THAT:

WHEREAS, ACE INVESTMENT COMPANY, a corporation organized and existing under the laws of the State of Delaware and hereinafter designated "Ace", is the holder of promissory notes of Keddy Manufacturing Co. in the amount of $2,782,388.09, which notes are attached hereto; and

WHEREAS, by unanimous action, all the members of the Board of Directors of Ace did, by written consent dated April 29, 1969, (1) transfer and assign said Keddy promissory notes to GRINNELL CORPORATION, a corporation organized and existing under the laws of the State of Delaware and hereinafter designated "Grinnell", without recourse, in exchange for the cancellation and discharge by Grinnell of promissory notes of Ace to Grinnell in the same amount, $2,782,388.09, and (2) authorize the officers of Ace to perform any act necessary to effectuate said transfer and assignment;

NOW THEREFORE, in consideration of Grinnell's cancellation and discharge of the indebtedness of Ace to Grinnell in the amount of $2,782,388.09 by Ace's receipt from Grinnell of its notes to Grinnell for this amount, which receipt Ace hereby acknowledges, Ace hereby transfers, assigns, sells, conveys and delivers to Grinnell the said Keddy promissory notes to Ace, which are attached hereto and endorsed without recourse by Ace, together with all claims and rights which Ace had against Keddy by reason of said notes.

ACE INVESTMENT COMPANY

By _____
President

On this [illegible] day of [illegible], 1969, before me personally appeared Eugene L. Mullaney, President of Ace Investment Company, to me known to be the person who executed the foregoing instrument, and acknowledged that he executed the same as his free act and deed.

Notary Public in and for the State of New York, residing in [illegible], N.Y.

My commission expires

March 30, 1970

GRINNELL CORPORATION

AUTOMATIC SPRINKLER SYSTEMS
GRINNELL DIAPHRAGM VALVES
PIPE HANGERS AND SUPPORTS

EXECUTIVE OFFICES PROVIDENCE I.R.I.

PROVIDENCE, R. I., 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

April 30, 1969

IN REPLY REFER TO -

To: Former Members of Board of Directors, Officers and Certain Employees of Keddy Manufacturing Co., Inc.

Sirs:

By written consent dated April 30, 1969 the stockholder of Keddy removed all members of the Keddy Board of Directors and replaced them with other individuals.

By written consent, dated April 30, 1969, the new Keddy Board of Directors removed all the Keddy officers and elected new officers, including Mr. C. H. Rison, President and Treasurer.

Accordingly, you are hereby notified of your removal, effective April 30, 1969 as directors and officers and your relief of all duties and powers as officers and directors to act on behalf of and bind the company as of that date.

Mr. Lawrence J. Keddy is hereby specifically notified that Grinnell Corporation terminates its employment contract with him, effective April 30, 1969. He is hereby relieved of all duties and powers as a plant manager or as any kind of employee of Keddy. He will be paid through the month of May 1969 at the usual rate and at the usual time for Keddy employees to be paid.

Messrs. Earl Keddy and Lester Keddy are hereby specifically notified that their services as employees of Keddy are terminated as of April 30, 1969. They will be paid through the month of May 1969 at their usual respective rates and at the usual time for Keddy employees to be paid.

Messrs. Lawrence Keddy, Earl Keddy and Lester Keddy are required to leave the premises of Keddy by the afternoon of May 1, 1969.

This letter or a copy of it is being shown to you by Mr. Arthur R. Davies at my instructions. He is authorized by me to issue in my name such other instructions as he deems necessary to carry out the foregoing.

C. H. Rison

President: Grinnell Corporation

President: Keddy Manufacturing Co., Inc.

KEDDY MANUFACTURING CO., INC.

I, David D. McKenney, Secretary of Keddy Manufacturing Co., Inc. do hereby certify that on April 30, 1969 all the Directors of the Corporation did unanimously consent in writing to the adoption of the following resolutions by the company.

VOTED: That the present officers of the Corporation be, and the same hereby are, removed for cause, and that the following persons be, and the same hereby are, elected officers of the Corporation until the next annual meeting of directors and until their successors are duly elected and qualified:

President and Treasurer	Clarence H. Rison
Secretary	David D. McKenney
Assistant Treasurer	James L. Kavanagh
Assistant Treasurer	Richard A. Hart

VOTED: That the necessary changes be effected in the authorized signatures on corporate bank accounts so as to permit checks to be signed by any one of the officers of the Corporation signing singly.

Witnesseth my hand this 30th day of April, 1969.

David D. McKenney

David D. McKenney

April 30, 1969

1. Stockholders' consent of Keddy to

(a) remove Board of Directors for cause and elect new Board of Directors, and

(b) adopt plan of liquidation under Section 332 of the Internal Revenue Code.

2. Directors' consent of Keddy to remove present officers for cause and elect new officers and change signatories on Bank accounts.

As Soon as Possible After April 30, 1969, and After Qualification of Grinnell in Massachusetts and Maine.

1. Execution of general instrument of transfer and assignment between Keddy and Grinnell. (Effective May , 1969)

2. Transfer of bank accounts.

3. Filing of Form 966 with the Internal Revenue Service.

4. Deeds, assignments and other instruments with respect to specific assets of Keddy which should be separately transferred.

5. Dissolution of Keddy.

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 1, 1969

Mr. Allan W. Fritzsche
575 Washington Avenue
Elyria, Ohio 44035

Dear Allan:

Mr. Rison learned quite suddenly that a substantial tax benefit can be realized by liquidating one of our small subsidiaries and making it a division of Grinnell Corporation. The enclosed consent of the members of the Board of Directors is required to accomplish this. Would you please sign all four copies of this consent and return them to me? The enclosed return envelope is for your convenience.

Very truly yours,

David D. McKenney
Secretary

DDM:ld

Enc.

GENERAL NOTICE

EFFECTIVE IMMEDIATELY KEDDY MANUFACTURING COMPANY, INC., WILL BE OPERATED AS A DIVISION OF GRINNELL CORPORATION AND, UNTIL FURTHER NOTICE, WILL BE UNDER THE DIRECTION OF EARL G. PAGE, JR.

GRINNELL CORPORATION

MAY 1, 1969

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 2, 1969

Harold Mitherz, Esq.
Tanzer, Mullaney, Mitherz & Pratt
230 Park Avenue
New York, N. Y. 10017

Dear Mr. Mitherz:

Re: Keddy Manufacturing Co.

Confirming our recent telephone conversation, all the members of the Board of Directors of Ace Investment Company consented in writing on April 29, 1969 to declaration of a dividend on April 29, 1969 of all the stock of Keddy Manufacturing Co. to the Ace stockholder of record on April 29, 1969, this stock consisting of 100 shares of common stock without par value, and Grinnell Corporation being the only Ace stockholder of record. Will you send me a certification of that consent.

The certificate of the Keddy shares for our files was endorsed to Grinnell by Mr. Eugene L. Mullaney, President of Ace, on April 29, 1969.

The PAYMENT AND ASSIGNMENT dated April 29, 1969, for our files, effectuates the dividend.

In the same consent the members of the Ace Board transferred and assigned to Grinnell the Keddy notes to Ace for $2,782,388.09 in exchange for cancellation by Grinnell of Ace notes to Grinnell in the same amount.

The TRANSFER AND ASSIGNMENT dated April 29, 1969, for our files, effectuates this part of the consent. We will send you the Ace notes when we have compared them with the Keddy notes. The last Keddy note to Ace was for $5,612.57.

Very truly yours,

David D. McKenney
Secretary

DDM:W

Enc Payment + Assignment (orig + one)
Transfer + Assignment (orig + one)
Keddy note to Ace $5,612.57

Mr. C. H. Rison
President

David D. McKenney
Secretary

May 3, 1969

Recapitalization
of Keddy Mfg. Co.

Dear Sir:

Enclosed are two sets of each of the items referred to in the enclosed time schedule -

(1) Certification of consent of Ace Board members.

(2) Certification of consent of Grinnell Board members.

(3) Payment and Assignment of Keddy stock to Grinnell as a dividend.

(4) Transfer and Assignment to Grinnell of Keddy notes to Ace.

(5) Contribution, Dedication and Release by Grinnell of Keddy notes to Keddy capital.

(6) Proxy from Grinnell to D. D. McKenney.

(7) Consent of Keddy stockholder electing new Board.

(8) Consent of Keddy directors electing new officers and recommending plan of liquidation.

(9) Consent of Keddy stockholder adopting plan.

These documents support:

(a) Removal from Grinnell's books, as of April 29, 1969, of Ace's indebtedness to Grinnell of $2,782,388.09.

(b) Increase in Keddy's capital of $2,782,388.09 as of April 29, 1969.

(Cont.)

Mr. C. H. Rison

May 3, 1969

(c) Listing on Grinnell's books of $1,000 income as of April 29, 1969.

Very truly yours,

David D. McKenney
Secretary

DDM:W
Enc.

NUMBER 1

SHARES -100-

INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE

KEDDY MANUFACTURING CO.

The Corporation is authorized to issue 100 Shares Without Nominal or Par Value

This Certifies that Ace Investment Company is the owner of

One hundred (100) Shares of the Capital Stock of

KEDDY MANUFACTURING CO., Fully Paid and Non-Assessable

transferable only on the books of the Corporation by the holder hereof in person or by duly authorized Attorney upon surrender of this Certificate properly endorsed.

In Witness Whereof, the said Corporation has caused this Certificate to be signed by its duly authorized officers and to be sealed with the Seal of the Corporation this 2nd day of June A.D. 1961

Asst. — SECRETARY — TREASURER

Vice — PRESIDENT

EXCELSIOR STATIONERY CO., 43 PARK PLACE, NEW YORK

CERTIFICATE

ISSUED TO

ACE INVESTMENT COMPANY

FOR

-100-

SHARES

OF THE

CAPITAL STOCK

OF

KEDDY MANUFACTURING CO.

DATED

June 2, 1961

For Value Received, hereby sell, assign, and transfer unto GRINNELL CORPORATION

Shares of the Capital Stock represented by the within Certificate, and do hereby irrevocably constitute and appoint Attorney to transfer the said Stock on the books of the within named Corporation with full power of substitution in the premises.

Dated April 29, 1969

In presence of

ACE INVESTMENT COMPANY

By: President

NOTICE. THE SIGNATURE OF THIS ASSIGNMENT MUST CORRESPOND WITH THE NAME AS WRITTEN UPON THE FACE OF THE CERTIFICATE, IN EVERY PARTICULAR WITHOUT ALTERATION OR ENLARGEMENT OR ANY CHANGE WHATEVER.

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 5, 1969

Harold Mitherz, Esq.
Tanzer, Mullaney, Mitherz & Pratt
230 Park Avenue
New York, N. Y. 10017

Dear Mr. Mitherz:

Enclosed are:

(1) One copy of Grinnell Proxy to David D. McKenney.

(2) One copy of Keddy Stockholder Consent electing new Keddy directors.

(3) One copy of Keddy Directors' Consent electing new Keddy officers and proposing Keddy liquidation.

(4) One copy of Keddy Stockholder Consent adopting plan of Keddy liquidation.

Very truly yours,

David D. McKenney
Secretary

DDM:W
Enc.

TANZER, MULLANEY, MITHERZ & PRATT
COUNSELORS AT LAW

LAURENCE ARNOLD TANZER
EUGENE L. MULLANEY
HAROLD MITHERZ
HOWARD A. PRATT

230 PARK AVENUE
NEW YORK 17
MURRAY HILL 9-0010

May 5, 1969

David D. McKenney, Esq.
Grinnell Corporation
Providence, Rhode Island 02901

Dear Mr. McKenney:

Enclosed is stock certificate No. 1 for 100 shares of Keddy Manufacturing Company, duly endorsed by Ace Investment Company to Grinnell Corporation.

Also, enclosed is certified copy of resolution by Board of Directors of Ace Investment Company.

Kind regards.

Sincerely,

Harold Mitherz

Enclosures

Mr. C. H. Rison
President

David D. McKenney
Secretary

May 7, 1969

Keddy Manufacturing Co.

Dear Sir:

Enclosed is Stock Certificate No. 1 for 100 shares of Keddy Manufacturing Co. duly endorsed by Ace Investment Company to Grinnell Corporation. Also enclosed are two certified copies of the consent of all the members of the Board of Directors of Ace Investment Company.

Very truly yours,

David D. McKenney
Secretary

DDM:ld
Enc.

TANZER, MULLANEY, MITHERZ & PRATT
COUNSELORS AT LAW

LAURENCE ARNOLD TANZER
EUGENE L. MULLANEY
HAROLD MITHERZ
HOWARD A. PRATT

230 PARK AVENUE
NEW YORK 17
MURRAY HILL 9-0010

May 8, 1969

David D. McKenney, Esq.
Grinnell Corporation
Providence, Rhode Island 02901

Dear Mr. McKenney:

Enclosed, as requested in your letter of May 2, 1969, is duly executed payment and assignment dated April 29, 1969, and transfer and assignment dated April 29, 1969. Also, enclosed are promissory notes of Keddy to Ace in the amount of $2,782,388.09, all duly endorsed without recourse to Grinnell in exchange for notes in the same total amount of Ace to Grinnell, which latter notes you will forward to me upon receipt hereof.

Kind regards.

Sincerely,

Harold Mitherz

P.S. Also enclosed is Ace note to Grinnell for $5,612.57, covering the last advance.

Enclosures

Notes all delivered to CHR
Mon. May 12. 1969

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 9, 1969

Registry of Deeds
Cumberland County
Portland
Maine

Dear Sir:

With respect to the deed recorded in Book 2611, Page 192, whereby Atlantic Mills, Inc. conveyed land to Keddy Manufacturing Co., would please determine whether a plan of the property was filed with that deed, and if so, would you please furnish me with one copy of said plan?

Please let me know what the charge for that copy is.

Very truly yours,

David D. McKenney
Counsel

DDM:ld

Mr. R. A. Hart
Chief Tax Accountant

May 13, 1969

David D. McKenney
Secretary

Dear Mr. Hart:

Enclosed herewith is a letter-statement from the Town of Windham for real estate taxes. I received it from Mr. Claude R. Branch with his letter to me of April 25 (copy also enclosed). Mr. Branch says that he does not understand the tax on Lot 7 of $7,271.32. I, too, am confused but for a different reason. I wonder why the 1967 taxes on Lot 7 are charged to Lawrence J. Keddy and the 1968 taxes on the same lot are charged to Keddy Manufacturing Co.?

This is apparently a copy of the original letter. If you need the original letter from Windham for your file I assume you can obtain it from Middleton.

Very truly yours,

David D. McKenney
Secretary

DDM:ld
Enc.

May 15, 1969

MEMORANDUM

Lawrence Keddy, while he was President of Keddy Manufacturing Co., had purchased in his own name a forging hammer and a motor generator set for induction melting.

Keddy Manufacturing Co. entered into two agreements with Lawrence Keddy, as an individual, to purchase these items from him.

Keddy Manufacturing Co. still owes Keddy approximately $28,000 for these two items. One of the agreements is about to end. The other has about two years to run. These were installment purchase arrangements.

We can stop making the payments if we find that these items of equipment are not satisfactory for our purposes but we forfeit payments made to date.

David D. McKenney
Secretary

DDM:ld

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 19, 1969

Robert E. Jacobson, Esq.
Edwards & Angell
1109 Hospital Trust Building
Providence, R. I. 02903

Subject: Liquidation of Keddy

Dear Mr. Jacobson:

Enclosed herewith for your file are two copies of each of the following:

(1) Payment and Assignment dated April 29, 1969 by Mr. Eugene L. Mullaney, President of Ace Investment Company, assigning to Grinnell Corporation as a dividend all of the shares of Keddy stock.

(2) Transfer and Assignment from Ace to Grinnell of the Keddy notes to Ace.

(3) Dedication from Grinnell to Keddy of the Keddy notes.

Very truly yours,

David D. McKenney
Counsel

DDM:ld

Enc.

EDWARDS & ANGELL
COUNSELLORS AT LAW

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
BANCROFT LITTLEFIELD
CHARLES P. WILLIAMSON
JOHN L. CLARK
JOHN V. KEAN
FREDERICK LIPPITT

EDWARD F. HINDLE
ROBERT S. DAVIS
KNIGHT EDWARDS
BEVERLY GLENN LONG
CHARLES E. CLAPP II
JAMES H. BARNETT
JAMES K. EDWARDS
ERNEST N. AGRESTI
STEPHEN A. FANNING, JR.
CALVERT C. GROTON

JOHN FENN BRILL
BENJAMIN P. HARRIS, III
ROBERT G. STETSON
RICHARD M. BOROD
PAUL J. CHOQUETTE, JR.

V. DUNCAN JOHNSON
JOHN H. BLISH
ROBERT S. BURNETT
PAUL F. GREENE
JAMES P. KELLY

WILLIAM H. EDWARDS
COUNSEL

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

15 Westminster Street
Providence
Rhode Island
02903

May 20, 1969

David D. McKenney, Esquire
Grinnell Corporation
Providence, Rhode Island 02901

Dear Dave:

Thank you very much for your letter of May 19 enclosing copies of certain of the documents in connection with the liquidation of Keddy.

Yours very truly,

Robert E. Jacobson

EDWARDS & ANGELL
COUNSELLORS AT LAW

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

15 Westminster Street
Providence
Rhode Island
02903

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
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V. DUNCAN JOHNSON
JOHN H. BLISH
ROBERT S. BURNETT
PAUL F. GREENE
JAMES P. KELLY

WILLIAM H. EDWARDS
COUNSEL

May 21, 1969

David McKenney, Esq.
Grinnell Corp.
260 West Exchange
Providence, Rhode Island

Re: Keddy Manufacturing Co., Inc.

Dear Dave:

I enclose Form 966 which is an information return required to be filed by a corporation within 30 days after the adoption of a Plan of Liquidation. Since the Plan of Liquidation for Keddy Manufacturing Co., Inc. was adopted on April 29, 1969 this return must be filed by May 29, 1969.

The return should be signed by Mr. Rison as President of Keddy. The Plan of Liquidation which is attached to the Form 966 should be certified by you as Secretary of Keddy. If you would then return the form to us we will see that it is filed within the time allowed.

Sincerely,

Ernest N. Gjost

Encs.

EDWARDS & ANGELL
COUNSELLORS AT LAW

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
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BEVERLY GLENN LONG
CHARLES E. CLAPP, II
JAMES H. BARNETT
JAMES K. EDWARDS
ERNEST N. AGRESTI
STEPHEN A. FANNING, JR.
CALVERT C. GROTON

JOHN FENN BRILL
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ROBERT G. STETSON
RICHARD M. BOROD
PAUL J. CHOQUETTE, JR.
V. DUNCAN JOHNSON
JOHN H. BLISH
ROBERT S. BURNETT
PAUL F. GREENE
JAMES P. KELLY

WILLIAM H. EDWARDS
COUNSEL

15 Westminster Street
Providence
Rhode Island
02903

May 23, 1969

Mr. David D. McKinney
Grinnell Corporation
260 West Exchange Street
Providence, Rhode Island

Dear Dave:

Re: Keddy Manufacturing Co., Inc.

Pursuant to our telephone conversation this morning, I am enclosing the original and two copies of the "Instrument of Transfer and Assignment and Assumption of Liabilities" transfering the assets of Keddy to Grinnell. Will you please have the appropriate officers of Keddy and Grinnell execute the original and one copy as we discussed on the phone and return them to me along with the I.R.S. Form 966.

As we have discussed, the effective date of the instrument (mentioned twice on page 4) has been left blank so that it could be filled in after Grinnell had qualified in Massachusetts. You will also note that the name of the officer signing on behalf of Grinnell Corporation will have to be filled in on page 5.

Very truly yours,

Robert S. Burnett

Enclosures

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

May 27, 1969

Ernest N. Agresti, Esq.
Edwards & Angell
15 Westminster Street
Providence, Rhode Island 02903

Dear Ernest:

Re: Keddy Manufacturing Co.

I have your letter of May 21st and Bob Burnett's letter of May 23rd.

Enclosed are both copies of Form 966 signed by Mr. Rison and the attached Plan of Liquidation, signed by me.

Also enclosed are the original and one copy of the Instrument of Transfer and Assignment and Assumption of Liabilities signed by Mr. Rison and me.

Very truly yours,

GRINNELL CORPORATION

David D. McKenney
Counsel

DDM/bam
Enclosures

MEMORANDUM FOR FILE

Re: Keddy Manufacturing Co.

The Keddy properties which are on record in Massachusetts and elsewhere should be transferred and assigned to Grinnell before Keddy is dissolved.

These properties include real estate, patents, trademarks, and vehicles.

We should also determine whether or not Keddy has recorded any financing statements and other security interests. As there are only a few of these, it would be wise to file assignments from Keddy to Grinnell.

DAVID D. McKENNEY

EDWARDS & ANGELL
COUNSELLORS AT LAW

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
BANCROFT LITTLEFIELD
CHARLES P. WILLIAMSON
JOHN L. CLARK
JOHN V. KEAN
FREDERICK LIPPITT

EDWARD F. HINDLE
ROBERT S. DAVIS
KNIGHT EDWARDS
BEVERLY GLENN LONG
CHARLES E. CLAPP, II
JAMES H. BARNETT
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ERNEST N. AGRESTI
STEPHEN A. FANNING, JR.
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JOHN FENN BRILL
BENJAMIN P. HARRIS, III
ROBERT G. STETSON
RICHARD M. BOROD
PAUL J. CHOQUETTE, JR.

V. DUNCAN JOHNSON
JOHN H. BLISH
ROBERT S. BURNETT
PAUL F. GREENE
JAMES P. KELLY

WILLIAM H. EDWARDS
COUNSEL

15 Westminster Street
Providence
Rhode Island
02903

June 3, 1969

BY MESSENGER

David McKenney, Esq.
Grinnell Corp.
260 West Exchange
Providence, Rhode Island

Re: Keddy Manufacturing Co., Inc.

Dear Dave:

Enclosed are two copies of the "Instrument of Transfer and Assignment and Assumption of Liabilities" and the Form 966 with the attached Plan of Liquidation.

Sincerely yours,

Bob Burnett

Enclosures

INSTRUMENT OF TRANSFER AND ASSIGNMENT
AND ASSUMPTION OF LIABILITIES

KNOW ALL MEN BY THESE PRESENTS:

That, KEDDY MANUFACTURING CO., INC., a corporation organized and existing under the laws of the State of Delaware (hereinafter called "Keddy"), for valuable consideration to it paid by GRINNELL CORPORATION, a corporation organized and existing under the laws of the State of Delaware (hereinafter called "Grinnell"), the receipt whereof is hereby acknowledged by Keddy, in accordance with the provisions of a Plan of Liquidation of Keddy, adopted by Keddy on April 30, 1969, has conveyed, granted, bargained, sold, transferred, set over, assigned, delivered and confirmed and by these presents does hereby convey, grant, bargain, sell, transfer, set over, assign, deliver and confirm unto Grinnell, the sole stockholder of Keddy, its successors and assigns, forever, subject to all mortgages, liens, encumbrances, liabilities, obligations, charges and contingencies, if any, with respect thereto, all of Keddy's assets, properties and businesses, of every kind and description, wherever located, as the same shall exist on the effective date hereof, including without limitation, all property, tangible and intangible, real, personal or mixed, cash, securities, bank accounts, notes receivable, accounts receivable, inventories, good will, the right to use Keddy's name, advances, deposits, prepayments, work-in-process, raw materials, supplies, leaseholds, leasehold improvements, utilities, tools, fixtures, machinery, equipment, vehicles, furniture, office furnishings and fixtures, claims and rights to tax refunds and benefits, all other claims of all kinds, rights under contracts, leases, insurance policies, trade names,

trademarks, trademark applications, copyrights, copyright applications, patents, patent applications, inventions, trade secrets, technical know-how, customers' lists and files, and all books and records of Keddy.

TO HAVE AND TO HOLD the same to Grinnell, its successors and assigns, forever, on the following terms:

1. Keddy agrees that, at any time and from time to time after the date hereof, it will, upon the request and at the expense of Grinnell, do, execute, acknowledge and deliver or will cause to be done, executed, acknowledged and delivered all such further acts, deeds, assignments, transfers, conveyances, powers of attorney and assurances as may be required for the better assigning, transferring, granting, conveying, assuring and confirming to Grinnell or for aiding and assisting in the collection of, or the reduction to possession, any or all of the assets and properties assigned, transferred, conveyed and delivered, or to be assigned, transferred, conveyed and delivered to Grinnell hereunder.

2. Keddy hereby names and irrevocably constitutes and appoints Grinnell, its successors and assigns, the true and lawful attorney or attorneys of Keddy, with full power of substitution, in the name of Grinnell or in the name of Keddy but on behalf of and for the benefit and at the expense of Grinnell, its successors and assigns, to demand and receive from time to time any and all assets and properties hereby assigned, transferred, conveyed and delivered to Grinnell; to give receipts, releases and acquittances for and in respect of the same or any part thereof; to collect, for the account of Grinnell all receivables and other items transferred to Grinnell as provided herein, and to endorse with the name of Keddy any checks received on account of any such receivables or other items; from

time to time to institute and prosecute in the name of Keddy or otherwise but at the expense and for the benefit of Grinnell, its successors and assigns, any and all proceedings at law, in equity or otherwise which Grinnell, its successors or assigns, may deem proper in order to collect, assert or enforce any claim, right, title or interest of any kind in or to the assets or properties hereby assigned, transferred, conveyed and delivered, or intended so to be, to defend or compromise any and all actions, suits or proceedings in respect of any of said assets or properties and to do all such acts and things in relation thereto as Grinnell, its successors or assigns, shall deem desirable. Keddy hereby declares that the foregoing powers are coupled with an interest and are and shall be irrevocable by Keddy or by its dissolution or in any manner or for any reason.

3. Nothing in this instrument shall be construed as an attempt to assign any claim, contract, license, lease, commitment, sales order, purchase order or any claim or right or any benefit arising thereunder or resulting therefrom if an attempted assignment thereof, without the consent of a third party thereto, would constitute a breach thereof or in any way affect the rights of Keddy or Grinnell thereunder. If such consent is not obtained, or if an attempted assignment thereof would be ineffective or would affect the rights of Keddy thereunder so that Grinnell would not in fact receive all rights, Keddy will cooperate with Grinnell in any arrangement desired to provide for the benefits under any such claims, contracts, licenses, leases, commitments, sales orders or purchase orders, including enforcement at the cost and for the benefit of Grinnell of any and all rights of Keddy against a third party thereto arising out of the breach

duly authorized.

KEDDY MANUFACTURING CO., ~~INC.~~

Clarence H. Rison,
President

Attest:
David D. McKinney,
Secretary

GRINNELL CORPORATION

Attest:

STATE OF RHODE ISLAND
County of Providence

In Providence on the 26th day of May, 1969, before me personally appeared the above-named Clarence H. Rison, the President of Keddy Manufacturing Co., Inc., a Delaware corporation, to me known and known by me to be the person executing the fore-g oing instrument for and in behalf of said corporation and he acknowledged said instrument by him executed to be his free act and deed in his said capacity and the free act and deed of said corporation.

Elizabeth A. Wilde
Notary Public

STATE OF RHODE ISLAND
County of Providence

In Providence on the 26th day of May, 1969, before me personally appeared the above-named CLARENCE H. RISON, the PRESIDENT of Grinnell Corporation, a Delaware corporation to me known and known by me to be the person executing the foregoing instrument for and in behalf of said corporation, and he acknowledged said instrument by him executed to be his free act and deed in his said capacity and the free act and deed of said corporation.

Elizabeth A. Wilde
Notary Public

or cancellation by such third party or otherwise; and any transfer or assignment to Grinnell by Keddy of any property or property rights or any contract or agreement which shall require the consent or approval of any third party, shall be made subject to such consent or approval being obtained.

4. Grinnell, in consideration of the covenants of Keddy hereinbefore contained and other valuable consideration to it paid by Keddy, -- the receipt of which is hereby acknowledged, -- for itself and for its successors and assigns, does hereby covenant and agree with Keddy, its successors and assigns, that it, Grinnell, will assume, undertake, pay, satisfy, discharge and perform all the legally enforceable debts, liabilities, obligations, contracts and commitments of Keddy of every kind, character or description, fixed or contingent, known or unknown, outstanding at the close of business on the effective date hereof, and will indemnify, save harmless and exonerate Keddy, its successors and assigns, from and against all actions, claims and demands in respect thereto.

5. This instrument shall be effective at the close of business on May 26, 1969, and shall be binding upon and inure to the benefit of the parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF as of the 26th day of May, 1969, Keddy and Grinnell have caused these presents and several counterparts hereof to be executed in their respective names and behalf by their respective officers, thereunto duly authorized, and their respective corporate seals to be hereunto and to said counterparts affixed by their respective officers, thereunto

EDWARDS & ANGELL
COUNSELLORS AT LAW

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
BANCROFT LITTLEFIELD
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ROBERT S. BURNETT
PAUL F. GREENE
JAMES P. KELLY

WILLIAM H. EDWARDS
COUNSEL

15 Westminster Street
Providence
Rhode Island
02903

June 5, 1969

David McKenney, Esq.
Grinnell Corp.
260 West Exchange Street
Providence, Rhode Island

Re: Keddy Manufacturing Co.

Dear Dave:

At the suggestion of Mr. Jacobson in our office, I am enclosing herewith the two executed copies of the "Instrument of Transfer and Assignment and Assumption of Liabilities". Keddy Manufacturing Co. and Grinnell Corporation, as the two parties who executed the instrument, should each hold in their records one of the executed copies.

We shall retain a xerox copy for our records.

Sincerely yours,

Bob Burnett

Enclosures

EDWARDS & ANGELL
15 WESTMINSTER STREET
PROVIDENCE, RHODE ISLAND
02903

June 3, 1969

Mr. David McKenney
Grinnell Corp.
260 West Exchange Street
Providence, Rhode Island

Re: Keddy Manufacturing Company

Dear Dave:

As you requested, I am enclosing two copies of our covering letter sent with the Internal Revenue Service Form 966.

Sincerely yours,

Bob Burnett

Enclosures

May 28, 1969

District Director
Internal Revenue Service
130 Broadway
Providence, Rhode Island

Re: Keddy Manufacturing Company

Dear Sir:

Enclosed is Form 966 reporting the adoption of a Plan of Liquidation by the above corporation on April 30, 1969.

Would you please acknowledge receipt on the enclosed copy of this letter.

Very truly yours,

s/ Ernest N. Agresti

ENA:SAhern
Encs.

FORM 966
(Rev. Sept. 1968)
U.S. Treasury Department
Internal Revenue Service

Corporate Dissolution or Liquidation

(Required under Section 6043 of the Internal Revenue Code)

Please Type or Print

Name of corporation: KEDDY MANUFACTURING CO., INC.	Employer identification number: 04-2279408
Number and street: Birch Road	
City or town, State, and ZIP code: Middleton, Massachusetts 01949	

1 Date incorporated: May 18, 1961	2 Place incorporated: Delaware	3 Type of liquidation: [X] Complete [ ] Partial
4 Internal Revenue Service office where last income tax return was filed and taxable year covered thereby: Consolidated return with Grinnell Corporation	Office: Providence, R.I.	Taxable year: 1967 - an extension has been obtained for the 1968 return
5 Date of adoption of resolution or plan of dissolution, or complete or partial liquidation: April 30, 1969		6 Taxable year of final return: 1969
7 Total number of shares outstanding at the time of adoption of the plan of liquidation →	Common: 100	Preferred: --
8 Dates of any amendments to plan of dissolution: N/A	9 Section of the Code under which the corporation is to be dissolved or liquidated: §332	
10 If this return is in respect of an amendment of or supplement to a resolution or plan previously adopted and a return has previously been filed in respect of such resolution or plan, give the date such return was filed →		Date: N/A

11 LIQUIDATION WITHIN ONE CALENDAR MONTH. If the corporation is a domestic corporation, and the plan of liquidation provides for a distribution in complete cancellation or redemption of all the capital stock of the corporation and for the transfer of all the property of the corporation under the liquidation entirely within one calendar month pursuant to section 333, and any shareholder claims the benefit of such section, then the corporation must also submit:

(a) A description of the voting power of each class of stock;

(b) A list of all the shareholders owning stock at the time of the adoption of the plan of liquidation, together with the number of shares of each class of stock owned by each shareholder, the certificate numbers thereof, and the total number of votes to which entitled on the adoption of the plan of liquidation; and

(c) A list of all corporate shareholders as of January 1, 1954, together with the number of shares of each class of stock owned by each such shareholder, the certificate numbers thereof, the total number of votes to which entitled on the adoption of the plan of liquidation, and a statement of all changes in ownership of stock by corporate shareholders between January 1, 1954, and the date of the adoption of the plan of liquidation, both dates inclusive.

Attach a certified copy of the resolution or plan, together with all amendments or supplements not previously filed.

SIGNATURE

Under penalties of perjury, I declare that I have examined this return, including accompanying schedules and statements, and to the best of my knowledge and belief it is true, correct, and complete.

CORPORATE SEAL

May 26, 1969 — Date

[signature] — Signature of officer

PRESIDENT — Title

INSTRUCTIONS

1. **Who must file.**—This form must be filed by every corporation that is to be dissolved or whose stock is to be liquidated in whole or in part.

2. **When to file.**—This form must be filed within 30 days after the adoption of the resolution or plan for or in respect of the dissolution of a corporation or the liquidation in whole or in part of its capital stock. If after the filing of a Form 966 there is an amendment or supplement to the resolution or plan, an additional Form 966 based on the resolution or plan as amended or supplemented must be filed within 30 days after the adoption of such amendment or supplement. A return in respect of an amendment or supplement will be deemed sufficient if it gives the date the prior return was filed and contains a certified copy of such amendment or supplement and all other information required by this form which was not given in such prior return.

3. **Where to file.**—This form must be filed with the Internal Revenue office with which the corporation is required to file its income tax return.

4. **Signature.**—The return must be signed either by the president, vice president, treasurer, assistant treasurer or chief accounting officer, or by any other corporate officer (such as tax officer) who is authorized to sign. A receiver, trustee, or assignee must sign any return which he is required to file on behalf of a corporation.

U.S. GOVERNMENT PRINTING OFFICE : 1968—O-299-081

PLAN OF LIQUIDATION UNDER SECTION 332
OF THE INTERNAL REVENUE CODE OF 1954

This plan of liquidation is for the purpose of effecting the complete liquidation and dissolution of Keddy Manufacturing Co., ~~Inc.~~, a Delaware corporation (the "Corporation"), in accordance with Section 332 of the Internal Revenue Code of 1954 in the following manner:

1. This plan shall be submitted to the sole stockholder of this Corporation, Grinnell Corporation, (the "Stockholder") and shall be effective upon its adoption by the affirmative vote of the holder of all of the outstanding shares of said Corporation.

2. Upon the approval of said plan the Corporation shall distribute all of its property in liquidation by transferring and delivering to the Stockholder an Instrument of Transfer and Assignment covering all assets of the Corporation subject to liabilities. Thereupon the Stockholder shall surrender its stock to the Corporation in complete cancellation and redemption thereof.

3. At the time of the transfers referred to in paragraph 2, all liabilities shall be assumed by the Stockholder by delivery of an assumption of liabilities.

4. From and after the date of the transfers referred to in paragraph 2, the Corporation shall not engage in any business activities. The directors and officers then in

office shall continue in office solely for the purpose of winding up the business and affairs of the Corporation.

5. After the date of the transfers referred to in paragraph 2 and as required by law, the officers of the Corporation shall execute and file final tax returns for the Corporation, Treasury Department Forms 966, 1096 and 1099L and all other returns, documents and information required to be filed.

6. After such liquidation shall be effected, the Corporation shall be dissolved in accordance with applicable Delaware law.

7. The directors and officers of the Corporation shall carry out and consummate this plan and shall have the power to adopt all resolutions, execute all documents, file all papers, and take all other action they deem necessary or desirable for the purpose of effecting the complete liquidation of the business assets and affairs of the Corporation and its dissolution.

"A true copy

ATTEST

David R. McKinney

Secretary

EDWARDS & ANGELL
COUNSELLORS AT LAW

ROBERT B. DRESSER
KIRK SMITH
ROBERT E. JACOBSON
EDWARD WINSOR
RONALD B. SMITH
GERALD W. HARRINGTON
BANCROFT LITTLEFIELD
CHARLES P. WILLIAMSON
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ROBERT S. BURNETT

PAUL F. GREENE
JAMES P. KELLY
DEMING E. SHERMAN
E. COLBY CAMERON

WILLIAM H. EDWARDS
COUNSEL

TELEPHONE 521-1100
AREA CODE 401
CABLE ADDRESS "EDWANGLE PROVIDENCE"

15 Westminster Street
Providence
Rhode Island
02903

July 25, 1969

Mr. David McKenny
Grinnell Corporation
260 West Exchange Street
Providence, Rhode Island

Dear David:

Re: Liquidation of Keddy Manufacturing Co.

Pursuant to our telephone conversation this afternoon, I am enclosing herewith a zerox copy of the index of documents, which I have prepared in connection with the above-captioned liquidation.

Also enclosed is a time schedule of transactions prepared by Ernest N. Agresti.

Sincerely,

Bob Burnett

Robert S. Burnett

Enclosures

GRINNELL CORPORATION

Re: Liquidation of Keddy Manufacturing Company

INDEX OF DOCUMENTS

1. Memorandum by ENA re Tax aspects of liquidation.
2. Time schedule
3. Assignment of stock in Keddy Manufacturing Company (Keddy) by Ace Investment Company (Ace) to Grinnell Corporation (Grinnell).
4. Assignment by Ace to Grinnell of notes given by Keddy to Ace, in exchange for cancellation of Ace's indebtedness to Grinnell.
5. Dedication to capital of notes running from Keddy to Grinnell.
6. "Instrument of Transfer and Assignment and Assumption of Liabilities" running from Keddy to Grinnell.
7. I.R.S. Form 966 with Plan of Liquidation attached.

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

August 22, 1969

Claude R. Branch, Esq.
Choate, Hall & Stewart
28 State Street
Boston, Massachusetts 02109

Dear Mr. Branch:

Re: Keddy

I have your letter of August 20. I have forwarded your statement to our Treasurer's Office with a recommendation for payment.

At the end of May, we liquidated Keddy Manufacturing Co. The two plants are now being operated under the name of Keddy Manufacturing Co., a Division of Grinnell Corporation.

As soon as we are able to transfer the real estate from Keddy to Grinnell Corporation, we intend to dissolve Keddy Manufacturing Co.

Very truly yours,

GRINNELL CORPORATION

David D. McKenney
Secretary

DDM/bam

OWEN HASKELL, Inc.

Civil Engineer—Land Surveyor

8 Broadway, South Portland, Maine 04106

Telephone 799-5694

October 16, 1969

Mr. David D. McKenney
Grinnell Company, Inc.
260 West Exchange Street
Providence, Rhode Island 02901

Dear Mr. McKenney:

Forwarded herewith is the linen drawing showing Keddy Manufacturing Co. land in South Windham, Maine.

Very truly yours,

Owen Haskell

Owen Haskell

OH/h

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

October 17, 1969

Registry of Deeds
Cumberland County
Portland, Maine

Gentlemen:

Enclosed is the deed dated October 17, 1969 from Keddy Manufacturing Co. to Grinnell Corporation.

I understand that the Maine Stamp Tax is not applicable here inasmuch as this deed is from a wholly owned subsidiary to the parent.

Please return the deed to me when you have recorded it. I enclose a return address label and postage for your convenience.

Very truly yours,

GRINNELL CORPORATION

David D. McKenney
Counsel

DDM/bam
Enclosures

D E E D

KNOW ALL MEN BY THESE PRESENTS that KEDDY MANUFACTURING CO., a Delaware corporation having a place of business in Windham, Cumberland County, in the State of Maine, for consideration of One Dollar ($1.00) and other valuable considerations paid by GRINNELL CORPORATION, a Delaware corporation duly qualified to do business in the State of Maine, the receipt of which is hereby acknowledged, does hereby grant, bargain, sell, and convey unto the said GRINNELL CORPORATION, its successors, and assigns forever a certain lot or parcel of land with the buildings thereon situated in the Town of Windham, County of Cumberland, and State of Maine bounded and described as follows:

Beginning at a point (marked by a monument set) on the easterly side line of Main Street (Route # 202), which point is located One Hundred Seventy-Five (175) feet southerly along said easterly side line of Main Street from the southwesterly corner of land now or formerly of Robert P. Miele, et al; thence South Seventy-Seven (77°) degrees Thirty-Three (33') minutes East Three Hundred Fifty-Five and Eighty-Three Hundredths (355.83) feet on a course which intersects the face of the westerly foundation of the main factory building situated on the land herein conveyed at a right angle thereto at a point (marked by a drill hole set); thence southerly along the said face of the westerly foundation Fifty-Eight and Seventy-Four Hundredths (58.74) feet to a corner of said foundation; thence easterly by the face of the southerly foundation of said building a distance of Three Hundred (300) feet to a point (marked by an iron set); thence South One (1°) degree Fifty-Five and One-Half (55½') minutes West Three

Hundred (300) feet to a point (marked by a monument set) which is located One Hundred Fifty (150) feet westerly of land now or formerly of the Maine Central Railroad, said distance being measured at a right angle to the westerly boundary of said Railroad land; thence South Seventy-Nine (79°) degrees Forty-Nine and One-Half (49½') minutes East One Hundred Fifty (150) feet to a point on said westerly Railroad boundary (marked by an iron set); thence North Ten (10°) degrees Ten and One-Half (10½') minutes East by said Railroad land a distance of Four Hundred Seventy-One and Thirty-Six Hundredths (471.36) feet to a point; thence northerly along said Railroad boundary along an arc having a radius of One Thousand Eight Hundred Eighty-One and Eighty-Six Hundredths (1881.86) feet One Hundred and Ninety-Seven Hundredths (100.97) feet to a point (marked by an iron set) on the southeasterly corner of land now or formerly of the Hart heirs; thence South Seventy-Five (75°) degrees Forty-Nine (49') minutes West by said land of the Hart heirs One Hundred Forty-Seven and Sixty-Five Hundredths (147.65) feet to the southerly corner of said land of the Hart heirs (marked by an iron set); thence North Forty-One (41°) degrees Twenty-Seven (27') minutes West Seventy-Two (72) feet to a southwesterly corner of the land of the Hart heirs (marked by an iron set); thence North Fifteen (15°) degrees Thirty-Two (32') minutes West One Hundred Forty-One (141) feet to the northwesterly corner of the land of the Hart heirs on the southerly side of Depot Street (marked by a monument set); thence South Seventy-Three (73°) degrees Twenty-Nine (29') minutes West Thirty-Five and Eighty-Three Hundredths (35.83) feet along the southerly side of Depot Street to a point (marked by an iron set); thence North Eighty-Nine (89°) degrees Seven (07') minutes West Two Hundred Eighty-One and Eighty-One Hundredths (281.81) feet to the northeasterly corner of land now or formerly owned by Dorothy Chaplin (marked by a monument set); thence South Fifteen (15°) degrees Forty-Six and One-Half (46½') minutes West

Fifty-Nine and Ninety-Seven Hundredths (59.97) feet to the southeasterly corner of said Chaplin land (marked by a monument set); thence North Eighty-Three (83°) degrees Two (02') minutes West Fifty-Five and Sixty-Five Hundredths (55.65) feet to the southwesterly corner of said Chaplin land (marked by an iron set); thence North Fifteen (15°)degrees Forty-Six and One-Half (46½') minutes East Fifty-Seven and Seventy-Five Hundredths (57.75) feet to the northwesterly corner of the Chaplin land on the southerly side line of Depot Street (marked by a monument set); thence North Eighty (80°) degrees Fifty-Five (55') minutes West Eighty-Nine and Fifty Hundredths (89.50) feet to the northeasterly corner of land now or formerly of Robert P. Miele (marked by an iron set); thence South Fifteen (15°) degrees Forty-Six and One-Half (46½') minutes West Fifty-Seven and Seventy-Five Hundredths (57.75) feet to the southeasterly corner of said Miele land (marked by an iron set); thence North Eighty (80°) degrees Fifty-Five (55') minutes West Ninety-Nine and Fifty Hundredths (99.50) feet to the southwesterly corner of the land of Robert P. Miele on the easterly side line of Main Street; thence South Thirteen (13°) degrees Fifteen and One-Half (15½') minutes West One Hundred Seventy-Five (175) feet to the point of beginning; together with all the Grantor's right, title, and interest in and to the land extending to the Central Line of all streets or roads adjoining said premises.

The above described premises are those shown in Exhibit A attached hereto and forming part of this deed, Exhibit A being entitled "PLAN OF LAND IN SOUTH WINDHAM, MAINE" by Owen Haskell, Inc., of South Portland, Maine, dated July 14, 1969.

Also conveyed herewith is right to have the office balcony which is now next to the face of the southerly wall of the main factory building project over the land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy.

Also conveyed herewith and appurtenant to the above described premises is a right-of-way for vehicles and pedestrians Thirty (30) feet in width over the land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy extending easterly from the easterly side of Main Street (Route # 202) at the point of beginning of the above described premises to a doorway located in the westerly foundation of the main factory building.

This conveyance is made subject to Maine Central Railroad side track agreements.

This conveyance is also made subject to a right-of-way conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348 and also subject to electrical distribution line rights-of-way as they may pertain to the above described premises reserved in the Deed of Cumberland Securities Corporation to Windham Fibres, Inc. dated July 25, 1945 recorded in said Registry of Deeds Book 1787, Page 353.

The above described premises are the premises conveyed by Atlantic Mills, Inc. to Keddy Manufacturing Co. by Deed dated June 6, 1961, recorded in said Registry of Deeds Book 2611, Page 192.

This conveyance is made subject to real estate taxes for 1969 which the Grantee herein assumes and agrees to pay.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said GRINNELL CORPORATION, its successors and assigns, to its and their use and behoof forever.

This deed is a grant from a wholly owned subsidiary to its parent corporation without other than nominal consideration.

IN WITNESS WHEREOF, said KEDDY MANUFACTURING CO. has caused this instrument to be executed and its corporate seal to be hereunto affixed by its President, thereunto duly authorized, this 17th day of October, 1969.

KEDDY MANUFACTURING CO.

By _____
President

STATE OF RHODE ISLAND
COUNTY OF PROVIDENCE, SC.

October 17, 1969

Then personally appeared the above-named Clarence H. Rison and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said corporation.

BEFORE ME,

Elizabeth A. Wilde
Notary Public

My commission expires June 30, 1971

Mr. C. H. Rison
President

Mr. David D. McKenney
Secretary and Counsel

October 22, 1969

Recording of Deed to
South Windham,
Maine Property

Dear Sir:

Enclosed herewith is a notice dated October 20 that the recording fee for the Deed from Keddy Manufacturing Co. to Grinnell Corporation of the premises in South Windham, Maine will be $18.00.

Accordingly, it is in order for a check to be prepared for this amount ($18.00) payable to "Registry of Deeds, Cumberland County, P. O. Box 183, 142 Federal Street, Portland, Maine, 04112".

Please send the check to me. I will send it to the Register.

Very truly yours,

David D. McKenney
Secretary and Counsel

DDM/bam
Enclosure

AUTOMATIC SPRINKLER SYSTEMS
UNIT HEATERS AND SPECIALTIES
AIR CONDITIONING EQUIPMENT

GRINNELL CORPORATION

EXECUTIVE OFFICES PROVIDENCE, R. I.

260 WEST EXCHANGE STREET
PROVIDENCE, R. I. 02901

PIPE, FITTINGS AND VALVES
PLUMBING AND HEATING MATERIAL
PREFABRICATED PIPING AND SUPPLIES

IN REPLY REFER TO-

AIR MAIL

December 29, 1969

The Corporation Trust Company
100 West Tenth Street
Wilmington 99, Delaware

Gentlemen:

Re: Keddy Manufacturing Co.,
a Delaware corporation

You are the resident agent of the above corporation which is a wholly owned subsidiary of Grinnell Corporation, also a Delaware corporation.

Enclosed are an executed original, executed carbon copy and executed Xerox copy of a certificate of dissolution under Section 275.

We would like to have this dissolution become effective before the end of the year. If this means recording as well as filing before the end of the year, please do what you can to accomplish such recording in time.

Very truly yours,

GRINNELL CORPORATION

David D. McKenney
Secretary

DDM:W

Enc.

CERTIFICATE OF DISSOLUTION

KEDDY MANUFACTURING CO., a corporation organized and existing under the General Corporation Law of the State of Delaware (hereinafter "Corporation"),

DOES HEREBY CERTIFY:

FIRST: That by unanimous written consent of the board of directors of the Corporation, dated December 29, 1969, resolutions were adopted in accordance with Section 141 of the above-mentioned Law as follows:

VOTED: That the board of directors deems it advisable to dissolve the Corporation in accordance with Section 275 of the General Corporation Law of the State of Delaware and hereby proposes and recommends such dissolution to the stockholders, and further,

VOTED: That the dissolution procedure under this Section 275 be initiated at such time as the officers of the Corporation see fit and be brought to completion, and that said officers be and hereby are authorized to initiate and complete such procedure and to take any and all other action necessary or advisable to dissolve the Corporation.

SECOND: That by unanimous written consent of the sole stockholder (Grinnell Corporation) given in lieu of meeting and vote of the stockholders, in accordance with Section 228 of the General Corporation Law of the State of Delaware, said sole stockholder did, on December 29, 1969, consent to the adoption of said resolutions.

THIRD: The names and residences of the directors and officers are:

1) Clarence H. Rison
56 President Avenue
Providence, Rhode Island
Director and President and Treasurer

2) David D. McKenney
8 Cedar Avenue
West Barrington, Rhode Island
Director and Secretary

3) Fielden L. Harvey
123 Calef Avenue
Swansea, Massachusetts
Director

4) James L. Kavanagh
30 Laurel Avenue
Providence, Rhode Island
Assistant Treasurer

5) Richard A. Hart
106 Florence Street
Providence, Rhode Island
Assistant Treasurer

IN WITNESS WHEREOF, said Keddy Manufacturing Co. has caused its corporate seal to be affixed and this certificate to be signed by Clarence H. Rison, its President, and attested by David D. McKenney, its Secretary, this 29th day of December, 1969.

KEDDY MANUFACTURING CO.

By Clarence H. Rison
Clarence H. Rison, President

ATTEST:

By David D. McKenney
David D. McKenney, Secretary

STATE OF RHODE ISLAND)
SS:
COUNTY OF PROVIDENCE)

BE IT REMEMBERED that on this 29th day of December, 1969, personally came before me, a Notary Public in and for the County and State aforesaid, Clarence H. Rison, President of Keddy Manufacturing Co., a corporation of the State of Delaware, and he duly executed said certificate before me and acknowledged the said certificate to be his act and deed and the act and deed of said corporation and that the facts stated therein are true; and that the seal affixed to said certificate and attested by the Secretary of said corporation is the common or corporate seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of office the day and year aforesaid.

Elizabeth A. Wilde
NOTARY PUBLIC

ELIZABETH A. WILDE
NOTARY PUBLIC
RHODE ISLAND

THE CORPORATION TRUST COMPANY
ASSOCIATED WITH C T CORPORATION SYSTEM
100 WEST TENTH STREET · WILMINGTON, DEL. 19899
TELEPHONE: OLYMPIA 8-7581 AREA CODE: 302

December 31, 1969

RE: KEDDY MANUFACTURING CO.

Grinnell Corporation
Att: David D. McKenney, Secretary
and Counsel
Providence, Rhode Island 02901

Dear Mr. McKenney:

Pursuant to instructions received through our Boston Office and pursuant to instructions contained in your letter of December 29, the executed Certificate of Dissolution of this corporation was filed with the Secretary of State of Delaware at 10 a.m., and a Certificate of Dissolution, as issued by the Secretary of State of Delaware, was recorded in the office of the Recorder of Deeds of New Castle County, Wilmington, Delaware, today. This certificate will be forwarded to you upon release by the Recorder in approximately five months.

Pursuant to further instructions received through our Boston Office, we advanced franchise tax due the State of Delaware in the amount of $71.30, covering 1967, 1968 and 1969 franchise tax, penalty and interest.

Very truly yours,

THE CORPORATION TRUST COMPANY

William J. Reif

William J. Reif

WJR:bjc

Mr. C. H. Rison
President

Mr. David D. McKenney
Counsel

January 5, 1970

Dissolution of Keddy
Manufacturing Co.

Dear Sir:

The Certificate of Dissolution of Keddy, dated December 29, 1969, was "filed" with the Secretary of State of Delaware on December 31 and "recorded" that same day. This completes the dissolution procedure.

Very truly yours,

David D. McKenney
Counsel

DDM/bam

Did Kiddy withdraw from Maine when qualified SCorp. on May 13, 1969?

SPECIAL NOTICE:

The enclosed Certificate of Foreign Corporation is for your use when needed.

This office again calls your attention to the fact that the Certificate of Foreign Corporation is not required to be filed with the annual license fee of $10, due March 1st, but is to be filed in accordance with 13 M.R.S.A. Section 595 which fixes the date for filing as "annually within 30 days after the date fixed for its annual meeting, or within 30 days after the final adjournment of said meeting, but not more than 3 months after the date fixed for said meeting, prepare and file in the office of the Secretary of State a certificate signed and sworn to by its president, treasurer or clerk showing the change or changes, if any, in the particulars included in the certificate required by Section 592 made since the filing of said certificate or of the last annual report. If no changes have occurred, a certificate to that effect shall be sufficient."

Secretary of State
Corporation Division
Augusta, Maine

JOSEPH T. EDGAR
SECRETARY OF STATE

ELDEN H. SHUTE, JR.
DEPUTY SECRETARY OF STATE

DORIS HAYES
SUPERVISOR
CORPORATION DIVISION

State of Maine
Department of State
CORPORATION DIVISION
AUGUSTA, MAINE 04330

February 1, 1970

TO: KEDDY MANUFACTURING CO.
Lawrence Keddy, Treas.
Middleton, Mass. 01949

Your annual license fee for 1970, amounting to $10.,

is due to the Secretary of State on March 1, 1970.

This notification is made in accordance with 13 M.R.S.A.

Section 595.

Please make check payable to the Treasurer of State.

Very truly yours,

Joseph T. Edgar

Secretary of State

NOTE:
When remitting fee to the Secretary of State please return this notice, completing the spaces below with the name of the present Treasurer of the corporation and the proper BUSINESS ADDRESS to which all notices and correspondence relative to the corporation should be sent.

TREASURER'S NAME_____

BUSINESS ADDRESS_____

_____

Delaware

The First State

I, HARRIET SMITH WINDSOR, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF AMENDMENT OF "GRINNELL CORPORATION", CHANGING ITS NAME FROM "GRINNELL CORPORATION" TO "ITT GRINNELL CORPORATION", FILED IN THIS OFFICE ON THE SECOND DAY OF NOVEMBER, A.D. 1971, AT 10 O'CLOCK A.M.

0152618 8100

070307144

Harriet Smith Windsor

Harriet Smith Windsor, Secretary of State

AUTHENTICATION: 5498805

DATE: 03-12-07

CERTIFICATE OF AMENDMENT

OF

GRINNELL CORPORATION

15 26 18

FILED

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CERTIFICATE OF AMENDMENT

OF

CERTIFICATE OF INCORPORATION

Grinnell Corporation, a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, DOES HEREBY CERTIFY:

FIRST: That at a meeting of the Board of Directors of Grinnell Corporation resolutions were adopted setting forth a proposed amendment to the Certificate of Incorporation of said corporation, declaring said amendment to be advisable and calling a meeting of the stockholders of said corporation for consideration thereof. The resolution setting forth the proposed amendment is as follows:

RESOLVED, that the Certificate of Incorporation of this corporation be amended by changing the Article thereof numbered "FIRST" so that, as amended said Article shall be and read as follows:

"FIRST: The name of the corporation is ITT Grinnell Corporation."

SECOND: That thereafter, pursuant to resolution of its Board of Directors, a special meeting of the stockholders of said corporation was duly called and held, upon written waiver of notice signed by all stockholders, at which meeting the necessary number of shares as required by statute

were voted in favor of the amendment.

THIRD: That said amendment was duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, said Grinnell Corporation has caused this certificate to be signed by William R. Hartman its President and attested by David D. McKenney, its Secretary, this 26th day of October, 1971.

GRINNELL CORPORATION

By _____
President

ATTEST:

By _____
Secretary

(SEAL)

BE IT REMEMBERED that on the 26th of October, A. D. 1971, personally came before me, a Notary Public in and for the County and State aforesaid, William R. Hartman, President of Grinnell Corporation, a Corporation of the State of Delaware, the corporation described in and which executed the foregoing certificate, known to me personally to be such, and he, the said William R. Hartman, as President duly executed said certificate before me and acknowledged the said certificate to be his act and deed and the act and deed of said corporation; that the signatures of the said President and of the Secretary of said corporation to said foregoing certificate are in the handwriting of the said company respectively, and that the seal affixed to said certificate is the common or corporate seal of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and seal of office the day and year aforesaid.

Elizabeth A. Wilde
Elizabeth A. Wilde
Notary Public

(SEAL)

ASSIGNMENT AND ASSUMPTION OF LIABILITIES

KNOW ALL MEN BY THESE PRESENTS, THAT this agreement, dated July 1, 1972, is by and between ITT Grinnell Corporation, a Delaware Corporation, having a principal place of business at 260 West Exchange Street, Providence, Rhode Island, (hereinafter referred to as ITT Grinnell) and Grinnell Fire Protection Systems Company, Inc., a Delaware Corporation, having a principal place of business at 10 Dorrance Street, Providence, Rhode Island, (hereinafter referred to as GFPS);

WHEREAS ITT Grinnell, in preparation for compliance with the final judgment, dated September 24, 1971, in United States v. International Telephone and Telegraph Corporation, U. S. D. C. (Conn.) Civil Action No. 13,319, which final judgment required International Telephone and Telegraph Corporation (hereinafter referred to as ITT), and its wholly-owned subsidiary ITT Grinnell to divest all their interest in the ITT Grinnell Fire Protection Division, did, at a meeting of the Executive Committee of the Board of Directors, duly called and held on June 21, 1972, make a contribution to the capital of its wholly-owned subsidiary GFPS, effective as of the opening of business on July 1, 1972, of all the assets of said Fire Protection Division, subject to the liabilities of said Fire Protection Division.

NOW THEREFORE, to further effect this contribution to capital:

(1) ITT Grinnell does hereby grant, bargain, sell, convey, transfer, set over and assign to GFPS all of the aforesaid assets, properties and business, both real and personal, tangible

and intangible, of every kind and nature, wherever located, of the Fire Protection Division, which existed at the close of business on June 30, 1972, (see Schedule A for balance sheet as of the opening of business on July 1, 1972), and as reflected on the books of ITT Grinnell, except (1) the Fire Protection Division trademarks in the United States and any other countries, created by operation of law or by registration and (2) the shares of stock of Conoflow Sprinkler, N.V. which has a place of business at Mechelaarstraat 6, N.L. Oorterhout, said assets, properties and business thus granted, bargained, sold, conveyed, transferred, set over, and assigned, being subject, however, to all the liabilities and obligations of the Fire Protection Division which existed at the close of business on June 30, 1972, and subject to all the liabilities and obligations which may arise after the opening of business on July 1, 1972, from events occurring in the Fire Protection Division operations before the close of business on June 30, 1972, and subject to all the liabilities and obligations which may arise after the opening of business on July 1, 1972, from events occurring in the GFPS operations after the opening of business on July 1, 1972. (See Schedule A for balance sheet as of the opening of business on July 1, 1972.)

Specifically, GFPS assumes, as part of this Agreement, all liability on the following notes and hereby agrees to discharge this liability by making payment of the face amount directly to the appropriate payee bank.

Bank	Note No.	Note Amount	Assign. Amount	Dates	Rate
First Union Ntl.Bk.					
Assigned Note	6328	$1 M	$1 M	6/12/-9/11	5%.
First Renewal	6366	$1 M	$1 M	9/11-12/12	5 1/2%
Marine Midland Grace					
Assigned Note	6316	$1 M	$1 M	5/11-8/9	5%
First Renewal	6355	$1 M	$1 M	8/9-11/7	5 1/4%

	Note No.	Note Amount	Assign. Amount	Dates	Rate
First Ntl.City Bk.of NY					
Assigned Note	6329	$1.5 M	$1 M	6/12-9/11	5 1/8%
First renewal	6367	$1.5 M	$1 M	9/11-12/12	5 5/8%
First National Chicago					
Assigned Note	6332	$2 M	$1 M	6/26-9/29	5%
First renewal	6370	$2 M	$1 M	9/29-12/27	5 1/2%
First Penna.Ntl.Bank					
Assigned Note	6307	$1.5 M	$1 M	4/10-7/10	5%
First renewal	6347	$1 M	$1 M	7/10-10/10	5 1/4%
Second renewal	6382	$1 M	$1 M	10/10-1/3	5 3/4%
Mellon National Bank					
Assigned Note	6310	$1 M	$1 M	4/7-7/6	5%
First renewal	6342	$1 M	$1 M	7/6-10/6	5 3/8%
Second renewal	6379	$1 M	$1 M	10/6-1/4	5 3/4%
Industrial National	Grid Nt.	$2 M	$2 M		
Chase Manhattan					
Assigned Note	6302	$ .5M	$ .5M	4/3-7/3	5%
First renewal	6335	$ .5M	$ .5M	7/3-10/2	5 1/4%
Second renewal	6373	$ .5M	$ .5M	10/2-1/3	5 1/2%
Continental Ill. Ntl.					
Assigned Note	6340	$2 M	$2 M	6/27-9/25	5 1/4%
First renewal	6368	$2 M	$2 M	9/25-12/27	5 1/2%
First National Atlanta					
Assigned Note	6324	$1 M	$ .5M	5/25-8/23	5%
First renewal	6362	$1 M	$ .5M	8/23-11/21	5 1/4%
R.I.Hosp.Trust Ntl.Bk.					
Assigned Note	6315	$2 M	$1.4M	5/8-8/7	5%
R.I.Hosp.Trust Ntl.Bk.					
Assigned Note	6306	$2 M	$2 M	4/6-7/5	5%
Assigned Note	6315	$2 M	$ .6M	5/8-8/7	5%
Wells Fargo Bank	6309	$1 M	$1 M	4/10-7/10	
Industrial Ntl.Bank	Grid Nt.	$2 M	$2 M		
Total			$18 M		

(2) ITT Grinnell agrees to execute all deeds, agreements, representations, guarantees, assignments, bills of sale, and other documents, which may be necessary, in the sole opinion

of ITT Grinnell, to formally vest title in GFPS to particular assets, properties, business and operations within the scope of this agreement.

(3) GFPS hereby expressly agrees to assume all liabilities and obligations of the ITT Grinnell Fire Protection Division which existed at the close of business on June 30, 1972, (see Schedule A for balance sheet as of the opening of business on July 1, 1972), and all the liabilities and obligations of GFPS which arise after the opening of business on July 1, 1972, from events occurring in the Fire Protection Division operations anytime before the close of business on June 30, 1972, and all the liabilities and obligations which may arise after the opening of business on July 1, 1972, and GFPS further agrees to be solely responsible for all such liabilities and obligations, and to indemnify and hold ITT Grinnell harmless from any and all claims arising under such said liabilities and obligations, and from all costs, including attorneys' fees, associated therewith. GFPS agrees to execute all agreements, guarantees, undertakings, novations, substitutions, leases, licenses, and other documents on which ITT Grinnell and/or others appear as parties which may be necessary in the opinion of ITT Grinnell to cause GFPS to formally assume particular liabilities and obligations and to relieve ITT Grinnell of the same.

(4) GFPS, subject to any required approval of the Internal Revenue Service, and subject to any restrictions by any governmental agency, law, regulations or policy, and as an

amendment and continuation without interruption of the "Grinnell Pension Plan for Salaried Employees of the Fire Protection Division," as amended effective on December 31, 1971, hereby expressly assumes and adopts for the benefit of its eligible employees, effective as of January 1, 1972, the "Retirement Plan for Salaried Employees of the Fire Protection Division of ITT Grinnell Corporation" which Plan had heretofore been adopted by the Board of Directors of ITT Grinnell on April 19, 1972 for the benefit of the eligible employees of its Fire Protection Division. In addition, GFPS expressly confirms, and assumes all rights, duties and obligations of ITT Grinnell under and pursuant to the related "Trust Agreement - Retirement Plan for Salaried Employees of the Fire Protection Division of ITT Grinnell Corporation" made as of May 15, 1972, between ITT Grinnell and Industrial National Bank of Rhode Island.

(5) To the extent that the assignment hereunder of any right, contract, agreement, plan, license, privilege, lease or the like of ITT Grinnell or the assumption of any liability or obligation by GFPS requires the consent of any other person not affiliated with ITT or ITT Grinnell, or requires the consent of any government, this Assignment and Assumption shall not constitute an assignment or agreement to assign or an assumption or agreement to assume until such consent is obtained, and shall not constitute an assignment or agreement to assign or assumption or agreement to assume if such an attempted assignment or assumption would constitute a breach of any such right, contract, agreement, plan,

IN WITNESS WHEREOF, ITT Grinnell and GFPS have caused these presents to be executed by their duly authorized officers, and their corporate seals to be affixed hereto, effective as of 5:30 P. M., eastern standard time, on June 30, 1972.

ITT GRINNELL CORPORATION

By: _____
William R. Hartman
President and Chief Executive Officer

ATTEST:

_____
David D. McKenney
Secretary

GRINNELL FIRE PROTECTION SYSTEMS COMPANY, INC.

By: _____
Earl G. Page
President and Chief Executive Officer

ATTEST:

_____
Donald E. Church
Assistant Secretary

10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

ITT Exhibit C: Real Estate Documents

- Deed from Atlantic Mills, Inc. to Keddy Manufacturing Co. 6/6/61 (3 pages)
- Letter from Owen Haskell to Grinnell dated 7/16/69 regarding survey difficulties (1 page)
- Deed from Atlantic Mills, Inc. to Keddy Manufacturing Co. 6/6/61 with undated page attached (4 pages)
- Deed from Keddy Manufacturing Co. to Grinnell Corporation dated 10/17/69 (4 pages)
- Plan of Keddy real property dated 7/14/69 (8 pages)
- Deed from ITT Grinnell Corporation to Park Corporation 7/21/73 (4 pages)
- Cancellation of Track Maintenance and permit to operate cranes 8/27/73 (2 pages)

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Atlantic Mills Inc

to

Keddy Mfg Co

-

War

See Book 3459 Page 305

KNOW ALL MEN BY THESE PRESENTS that ATLANTIC MILLS, INC. a Corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a place of business at Windham in the County of Cumberland and State of Maine, in consideration of One Dollar ($1.00) and other valuable considerations paid by KEDDY MANUFACTURING CO., a Corporation organized and existing under the laws of the State of Delaware, the receipt whereof it does hereby acknowledge, does hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY, unto the said KEDDY MANUFACTURING CO., its successors and assigns forever a certain lot or parcel of land with the buildings thereon, situated in the Town of Windham, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a point on the easterly side line of Main Street, which point is located one hundred seventy-five (175) feet southerly along said easterly side line of Main Street from the southwesterly corner of land now or formerly of Robert Miele, et al; thence easterly three hundred seventy (370) feet, more or less on a course which intersects the face of the westerly foundation of the main factory building situated on the land herein conveyed at a right angle thereto; thence southerly along the said face of the westerly foundation thirty (30) feet, more or less, to a corner of said foundation; thence easterly by the face of the southerly foundation of said building a distance of three hundred (300) feet to a point; thence southeasterly three hundred (300) feet to a point which is located one hundred fifty (150) feet westerly of land now or formerly of the Maine Central Railroad, said distance being measured at a right angle to said railroad land; thence easterly one hundred fifty (150) feet to said railroad land; thence northerly by said railroad land a distance of six hundred (600) feet, more or less, to land now or formerly of the Hart heirs; thence South 72° 51' West by said land of the Hart heirs one hundred thirty-five (135) feet, more or less, to a corner thereof; thence North 44° 25' West by land of the said Hart heirs seventy-two (72) feet, more or less to a cement monument; thence North 18° 30' West by land of the said Hart heirs one hundred forty-one (141) feet, more or less to the southerly side line of Depot Street; thence westerly by the southerly side line of Depot Street to land now or formerly of Charles W. Bailey; thence southerly by land of the said Bailey to the southeasterly corner thereof; thence westerly by said land of Bailey seventy-four (74) feet to the southwesterly corner thereof; thence northerly by said land of Bailey to the southerly side line of Depot Street; thence by the southerly side line of Depot Street ninety (90) feet, more or less, to land now or formerly of Robert Miele, et al; thence southerly by said Miele land

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fifty-eight (58) feet to the southeasterly corner thereof; thence North 83° 53' West by said land of Miele to the easterly side line of Main Street, aforesaid; thence southerly by the easterly side line of Main Street one hundred seventy-five (175) feet to the point of beginning; together with all the Grantor's right, title and interest in and to the land extending to the center line of all streets or roads adjoining said premises. Also including the right to have the office balcony, which is now annexed to the face of the southerly wall of said main factory building, project over the remaining land of the Grantor.

Also conveyed herewith and appurtenant to the above described premises is a right of way for vehicles and pedestrians thirty (30) feet in width over the remaining land of the Grantor extending easterly from the easterly side line of Main Street at the point of beginning of the above described premises to a doorway located in the westerly foundation of the main factory building.

This conveyance is made subject to Maine Central Railroad side track agreements.

This conveyance is also made subject to a right of way conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348 and also subject to electricial distribution line rights of way as they may pertain to the above described premises reserved in the deed of Cumberland Securities Corporation to Windham Fibres, Inc. dated July 25, 1945, recorded in said Registry of Deeds, Book 1787, Page 353.

The above described premises are a portion of the premises conveyed by Irving Fox, et al, to Atlantic Mills, Inc. by deed dated August 19, 1954, recorded in said Registry of Deeds, Book 2192, Page 14.

This conveyance is made subject to real estate taxes for 1961 which the Grantee herein assumes and agrees to pay.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said KEDDY MANUFACTURING CO., its successors and assigns, to its and their use and behoof forever.

AND the said Grantor Corporation does hereby COVENANT with the said Grantee, its successors and assigns, that it is lawfully seized in fee of the premises, that they are free of all encumbrances, except as aforesaid, that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will WARRANT AND DEFEND the same to the said Grantee, its successors and

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assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

IN WITNESS WHEREOF, the said Atlantic Mills, Inc. has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Lawrence J. Keddy, its President and Treasurer, thereunto duly authorized, this 6th day of June in the year one thousand nine hundred and sixty-one.

SIGNED, SEALED AND DELIVERED IN PRESENCE OF

ATLANTIC MILLS, INC.

[signature]

By [signature]
Its President & Treasurer

STATE OF Massachusetts)
COUNTY OF Suffolk) ss. June 6, , 1961

Then personally appeared the above named Lawrence J. Keddy President and Treasurer of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

[signature]
Notary Public
My commission expires January 7, 1967

JUN 20 1961
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 3 H 16 M P. M, and recorded in
BOOK 2611 PAGE 192 [signature] Register

OWEN HASKELL, INC.
Civil Engineer — Land Surveyor
8 Broadway, South Portland, Maine 04106
Telephone 799-5694

July 16, 1969

Mr. R. A. Hart, Chief Tax Accountant
Grinnel Company, Inc.
260 West Exchange Street
Providence, Rhode Island

Dear Mr. Hart:

Enclosed are 4 prints showing land of Keddy Manufacturing Co. in South Windham, Maine. The corners of the land have been marked as shown. We have encountered considerable difficulty in locating the boundaries of all the lots fronting on Depot Street. The results shown indicate our best judgement of these boundaries, and it is recommended that the linen original of our plan be recorded in the Cumberland County Registry of Deeds to avoid any future difficulties with them.

You will note that the South boundary, from Route 202 to the mill building, intersects the building 58.74 feet from its Southwest corner rather than "30 feet more or less" as indicated in the deed of Keddy Manufacturing Co. We believe that the call for a "right angle" at this intersection is the controlling factor in the deed, although it may not have been the original intent of the scrivener. A copy of this deed is enclosed for your reference.

In regard to the 30' right of way from Route 202 to the mill building, the East end of this right of way is not adequately tied down in the deed. We have shown a possible layout for the right of way on the plan, but it is our opinion that East end could be moved Southerly as much as 15' and still be a reasonable interpretation of the deed. Possibly you will want to nail down a location for this right of way.

Finally there is a possibility that a 100' transmission line right of way straddles the most Southerly boundary of the Keddy Manufacturing land. There are 2 such rights of way described in the deed from Cumberland Securities Corp. to Windham Fibres, Inc. dated July 25, 1945 and recorded in the Registry in Book 1787 page 353. The first of these rights of way is shown on the enclosed plan. The location of the second right of way is not subject to accurate determination as described in the above deed. (see copy enclosed). It could run from the Substation to the Hydro Power plant, and if so it could overlap the South boundary of the Keddy Manufacturing Co. land.

We appreciate the opportunity of working for you and trust that you will contact us if you need any further information in regards to this survey. Also please let us know if you want the linen original of our plan recorded in the Registry of Deeds.

Very truly yours,

Owen Haskell

Owen Haskell

OH/h

P.S. Only one print enclosed because we ran out of print paper. 3 more to follow tomorrow.

Book 2611 page 192

192

Atlantic Mills Inc

to

Keddy Mfg Co

-

War-

KNOW ALL MEN BY THESE PRESENTS that ATLANTIC MILLS, INC. a Corporation organized and existing under the laws of the Commonwealth of Massachusetts and having a place of business at Windham in the County of Cumberland and State of Maine, in consideration of One Dollar ($1.00) and other valuable considerations paid by KEDDY MANUFACTURING CO., a Corporation organized and existing under the laws of the State of Delaware, the receipt whereof it does hereby acknowledge, does hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY, unto the said KEDDY MANUFACTURING CO., its successors and assigns forever a certain lot or parcel of land with the buildings thereon, situated in the Town of Windham, County of Cumberland and State of Maine, bounded and described as follows:

Beginning at a point on the easterly side line of Main Street, which point is located one hundred seventy-five (175) feet southerly along said easterly side line of Main Street from the southwesterly corner of land now or formerly of Robert Miele, et al; thence easterly three hundred seventy (370) feet, more or less on a course which intersects the face of the westerly foundation of the main factory building situated on the land herein conveyed at a right angle thereto; thence southerly along the said face of the westerly foundation thirty (30) feet, more or less, to a corner of said foundation; thence easterly by the face of the southerly foundation of said building a distance of three hundred (300) feet to a point; thence southeasterly three hundred (300) feet to a point which is located one hundred fifty (150) feet westerly of land now or formerly of the Maine Central Railroad, said distance being measured at a right angle to said railroad land; thence easterly one hundred fifty (150) feet to said railroad land; thence northerly by said railroad land a distance of six hundred (600) feet, more or less, to land now or formerly of the Hart heirs; thence South 72° 51' West by said land of the Hart heirs one hundred thirty-five (135) feet, more or less, to a corner thereof; thence North 44° 25' West by land of the said Hart heirs seventy-two (72) feet, more or less to a cement monument; thence North 18° 30' West by land of the said Hart heirs one hundred forty-one (141) feet, more or less to the southerly side line of Depot Street; thence westerly by the southerly side line of Depot Street to land now or formerly of Charles W. Bailey; thence southerly by land of the said Bailey to the southeasterly corner thereof; thence westerly by said land of Bailey seventy-four (74) feet to the southwesterly corner thereof; thence northerly by said land of Bailey to the southerly side line of Depot Street; thence by the southerly side line of Depot Street ninety (90) feet, more or less, to land now or formerly of Robert Miele, et al; thence southerly by said Miele land

fifty-eight (58) feet to the southeasterly corner thereof; thence North 83° 53' West by said land of Micle to the easterly side line of Main Street, aforesaid; thence southerly by the easterly side line of Main Street one hundred seventy-five (175) feet to the point of beginning; together with all the Grantor's right, title and interest in and to the land extending to the center line of all streets or roads adjoining said premises. Also including the right to have the office balcony, which is now annexed to the face of the southerly wall of said main factory building, project over the remaining land of the Grantor.

Also conveyed herewith and appurtenant to the above described premises is a right of way for vehicles and pedestrians thirty (30) feet in width over the remaining land of the Grantor extending easterly from the easterly side line of Main Street at the point of beginning of the above described premises to a doorway located in the westerly foundation of the main factory building.

This conveyance is made subject to Maine Central Railroad side track agreements.

This conveyance is also made subject to a right of way conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348 and also subject to electricial distribution line rights of way as they may pertain to the above described premises reserved in the deed of Cumberland Securities Corporation to Windham Fibres, Inc. dated July 25, 1945, recorded in said Registry of Deeds, Book 1787, Page 353.

The above described premises are a portion of the premises conveyed by Irving Fox, et al, to Atlantic Mills, Inc. by deed dated August 19, 1954, recorded in said Registry of Deeds, Book 2192, Page 14.

This conveyance is made subject to real estate taxes for 1961 which the Grantee herein assumes and agrees to pay.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said KEDDY MANUFACTURING CO., its successors and assigns, to its and their use and behoof forever.

AND the said Grantor Corporation does hereby COVENANT with the said Grantee, its successors and assigns, that it is lawfully seized in fee of the premises, that they are free of all encumbrances, except as aforesaid, that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will WARRANT AND DEFEND the same to the said Grantee, its successors and

assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

IN WITNESS WHEREOF, the said Atlantic Mills, Inc. has caused this instrument to be sealed with its corporate seal and signed in its corporate name by Lawrence J. Keddy, its [illegible] Treasurer, thereunto duly authorized, this 6th day of June in the year one thousand nine hundred and sixty-one.

SIGNED, SEALED AND DELIVERED IN PRESENCE OF

Gerard M. Kilcoyne

ATLANTIC MILLS, INC.

By Lawrence J. Keddy
Its President & Treasurer

STATE OF Massachusetts)
: ss. June 6, , 1961
COUNTY OF Suffolk)

Then personally appeared the above named Lawrence J. Keddy President and Treasurer of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

Notary Public
My commission expires January 7, 1967

JUN 20 1961
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 3 H 16 M P M, and recorded in
BOOK 2611 PAGE 192
Register

said dams and appurtenances connected therewith and to repair, replace and maintain such part of the southerly and westerly walls of said main Building and the Extensic thereof and the Wheel House as may be necessary in the opinion of the Grantor to enable it to efficiently operate its said dam or any other dams constructed at or near Little Falls, so called; provided that the exercise of said right shall not unreasonably interfere with the operation and use by the Grantee of the premises hereby conveyed.

Also excepting and reserving as aforesaid the right to pass and repass for an and all purposes to and from Depot Street to any point on said one-rod strip located along the easterly bank of the Presumpscot River and/or to its dam constructed a said Little Falls along the two rights of way as the same are now located from Depo Street, and through the buildings as the same now are or hereafter may be construct ed upon the above described premises along suitable and convenient rights of way to be designated by the parties hereto.

Also excepting and reserving as aforesaid the perpetual rights and easements to erect, repair, rebuild, operate and patrol electric transmission and distributior lines consisting of suitable and sufficient poles and/or towers with sufficient foundations, together with wires strung upon and extending between the same for the transmission of electric energy, together with all necessary fixtures, cross-arms, braces, anchors, wires and guys over and along (1) a strip of land 100 feet in width and extending from the southerly boundary of the above described premises on the easterly side of the Presumpscot River to a point 25 feet distant northerly from the Grantor's substation as the same is now constructed on the easterly side of said Presumpscot River, the westerly boundary of said strip to be 37½ feet distant westerly from the center line of the present transmission line of the Grantor as the same is now constructed and the easterly boundary to be 62½ feet distant easterly from the center line of said transmission line as now constructed; and (2) a strip of land 100 feet in width extending in a westerly direction from said substation or from some suitable and convenient point on the aforesaid pole line to the easterly line of the premises hereby conveyed; also the right to cut, trim and remove such trees, branches and underbrush as will in the opinion of the Grantor, its successors or assigns, interfere with or endanger the operation of said electric lines; also the right to cut, trim and remove any tall trees located outside either of said strips which in falling would in the opinion of the Grantor, its successors or assigns, interfere with or endanger the operation of said lines.

Also excepting and reserving as aforesaid the perpetual rights and easements (1) to operate, repair, replace and maintain the Grantor's said substation as the same is now located; (2) to operate, repair, rebuild and maintain the Grantor's distribution line as the same is now constructed extending from its substation to the southerly wall of the Grantee's building, including the fixtures attached to said building; (3) to erect, operate, repair, rebuild and maintain a distribution line to

See Book 3459 Page 305

D E E D

KNOW ALL MEN BY THESE PRESENTS that KEDDY MANUFACTURING CO., a Delaware corporation having a place of business in Windham, Cumberland County, in the State of Maine, for consideration of One Dollar ($1.00) and other valuable considerations paid by GRINNELL CORPORATION, a Delaware corporation duly qualified to do business in the State of Maine, the receipt of which is hereby acknowledged, does hereby grant, bargain, sell, and convey unto the said GRINNELL CORPORATION, its successors, and assigns forever a certain lot or parcel of land with the buildings thereon situated in the Town of Windham, County of Cumberland, and State of Maine bounded and described as follows:

> Beginning at a point (marked by a monument set) on the easterly side line of Main Street (Route # 202), which point is located One Hundred Seventy-Five (175) feet southerly along said easterly side line of Main Street from the southwesterly corner of land now or formerly of Robert P. Miele, et al; thence South Seventy-Seven (77°) degrees Thirty-Three (33') minutes East Three Hundred Fifty-Five and Eighty-Three Hundredths (355.83) feet on a course which intersects the face of the westerly foundation of the main factory building situated on the land herein conveyed at a right angle thereto at a point (marked by a drill hole set); thence southerly along the said face of the westerly foundation Fifty-Eight and Seventy-Four Hundredths (58.74) feet to a corner of said foundation; thence easterly by the face of the southerly foundation of said building a distance of Three Hundred (300) feet to a point (marked by an iron set); thence South One (1°) degree Fifty-Five and One-Half (55½') minutes West Three

Hundred (300) feet to a point (marked by a monument set) which is located One Hundred Fifty (150) feet westerly of land now or formerly of the Maine Central Railroad, said distance being measured at a right angle to the westerly boundary of said Railroad land; thence South Seventy-Nine (79°) degrees Forty-Nine and One-Half (49½') minutes East One Hundred Fifty (150) feet to a point on said westerly Railroad boundary (marked by an iron set); thence North Ten (10°) degrees Ten and One-Half (10½') minutes East by said Railroad land a distance of Four Hundred Seventy-One and Thirty-Six Hundredths (471.36) feet to a point; thence northerly along said Railroad boundary along an arc having a radius of One Thousand Eight Hundred Eighty-One and Eighty-Six Hundredths (1881.86) feet One Hundred and Ninety-Seven Hundredths (100.97) feet to a point (marked by an iron set) on the southeasterly corner of land now or formerly of the Hart heirs; thence South Seventy-Five (75°) degrees Forty-Nine (49') minutes West by said land of the Hart heirs One Hundred Forty-Seven and Sixty-Five Hundredths (147.65) feet to the southerly corner of said land of the Hart heirs (marked by an iron set); thence North Forty-One (41°) degrees Twenty-Seven (27') minutes West Seventy-Two (72) feet to a southwesterly corner of the land of the Hart heirs (marked by an iron set); thence North Fifteen (15°) degrees Thirty-Two (32') minutes West One Hundred Forty-One (141) feet to the northwesterly corner of the land of the Hart heirs on the southerly side of Depot Street (marked by a monument set); thence South Seventy-Three (73°) degrees Twenty-Nine (29') minutes West Thirty-Five and Eighty-Three Hundredths (35.83) feet along the southerly side of Depot Street to a point (marked by an iron set); thence North Eighty-Nine (89°) degrees Seven (07') minutes West Two Hundred Eighty-One and Eighty-One Hundredths (281.81) feet to the northeasterly corner of land now or formerly owned by Dorothy Chaplin (marked by a monument set); thence South Fifteen (15°) degrees Forty-Six and One-Half (46½') minutes West

Fifty-Nine and Ninety-Seven Hundredths (59.97) feet to the southeasterly corner of said Chaplin land (marked by a monument set); thence North Eighty-Three (83°) degrees Two (02') minutes West Fifty-Five and Sixty-Five Hundredths (55.65) feet to the southwesterly corner of said Chaplin land (marked by an iron set); thence North Fifteen (15°)degrees Forty-Six and One-Half (46½') minutes East Fifty-Seven and Seventy-Five Hundredths (57.75) feet to the northwesterly corner of the Chaplin land on the southerly side line of Depot Street (marked by a monument set); thence North Eighty (80°) degrees Fifty-Five (55') minutes West Eighty-Nine and Fifty Hundredths (89.50) feet to the northeasterly corner of land now or formerly of Robert P. Miele (marked by an iron set); thence South Fifteen (15°) degrees Forty-Six and One-Half (46½') minutes West Fifty-Seven and Seventy-Five Hundredths (57.75) feet to the southeasterly corner of said Miele land (marked by an iron set); thence North Eighty (80°) degrees Fifty-Five (55') minutes West Ninety-Nine and Fifty Hundredths (99.50) feet to the southwesterly corner of the land of Robert P. Miele on the easterly side line of Main Street; thence South Thirteen (13°) degrees Fifteen and One-Half (15½') minutes West One Hundred Seventy-Five (175) feet to the point of beginning; together with all the Grantor's right, title, and interest in and to the land extending to the Central Line of all streets or roads adjoining said premises.

The above described premises are those shown in Exhibit A attached hereto and forming part of this deed, Exhibit A being entitled "PLAN OF LAND IN SOUTH WINDHAM, MAINE" by Owen Haskell, Inc., of South Portland, Maine, dated July 14, 1969.

Also conveyed herewith is right to have the office balcony which is now next to the face of the southerly wall of the main factory building project over the land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy.

Also conveyed herewith and appurtenant to the above described premises is a right-of-way for vehicles and pedestrians Thirty (30) feet in width over the land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy extending easterly from the easterly side of Main Street (Route # 202) at the point of beginning of the above described premises to a doorway located in the westerly foundation of the main factory building.

606

This conveyance is made subject to Maine Central Railroad side track agreements.

This conveyance is also made subject to a right-of-way conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348 and also subject to electrical distribution line rights-of-way as they may pertain to the above described premises reserved in the Deed of Cumberland Securities Corporation to Windham Fibres, Inc. dated July 25, 1945 recorded in said Registry of Deeds Book 1787, Page 353.

The above described premises are the premises conveyed by Atlantic Mills, Inc. to Keddy Manufacturing Co. by Deed dated June 6, 1961, recorded in said Registry of Deeds Book 2611, Page 192.

This conveyance is made subject to real estate taxes for 1969 which the Grantee herein assumes and agrees to pay.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said GRINNELL CORPORATION, its successors and assigns, to its and their use and behoof forever.

This deed is a grant from a wholly owned subsidiary to its parent corporation without other than nominal consideration.

IN WITNESS WHEREOF, said KEDDY MANUFACTURING CO. has caused this instrument to be executed and its corporate seal to be hereunto affixed by its President, thereunto duly authorized, this 17th day of October, 1969.

KEDDY MANUFACTURING CO.

By Clarence R. Rison
President

-4-

STATE OF RHODE ISLAND

COUNTY OF PROVIDENCE, SC.

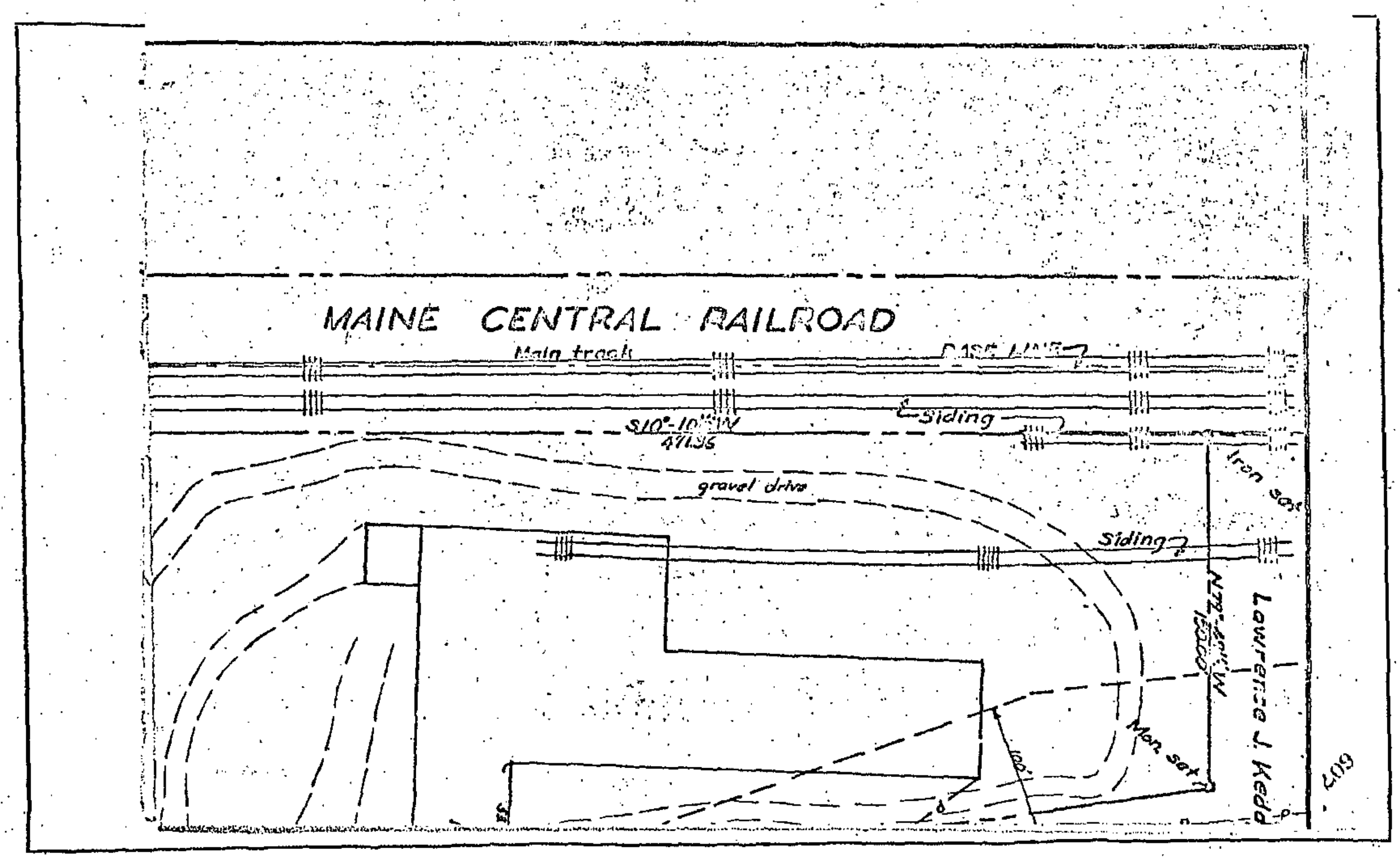
October 17, 1969

Then personally appeared the above-named Clarence R. Rison and acknowledged the foregoing instrument to be his free act and deed in his said capacity and the free act and deed of said corporation.

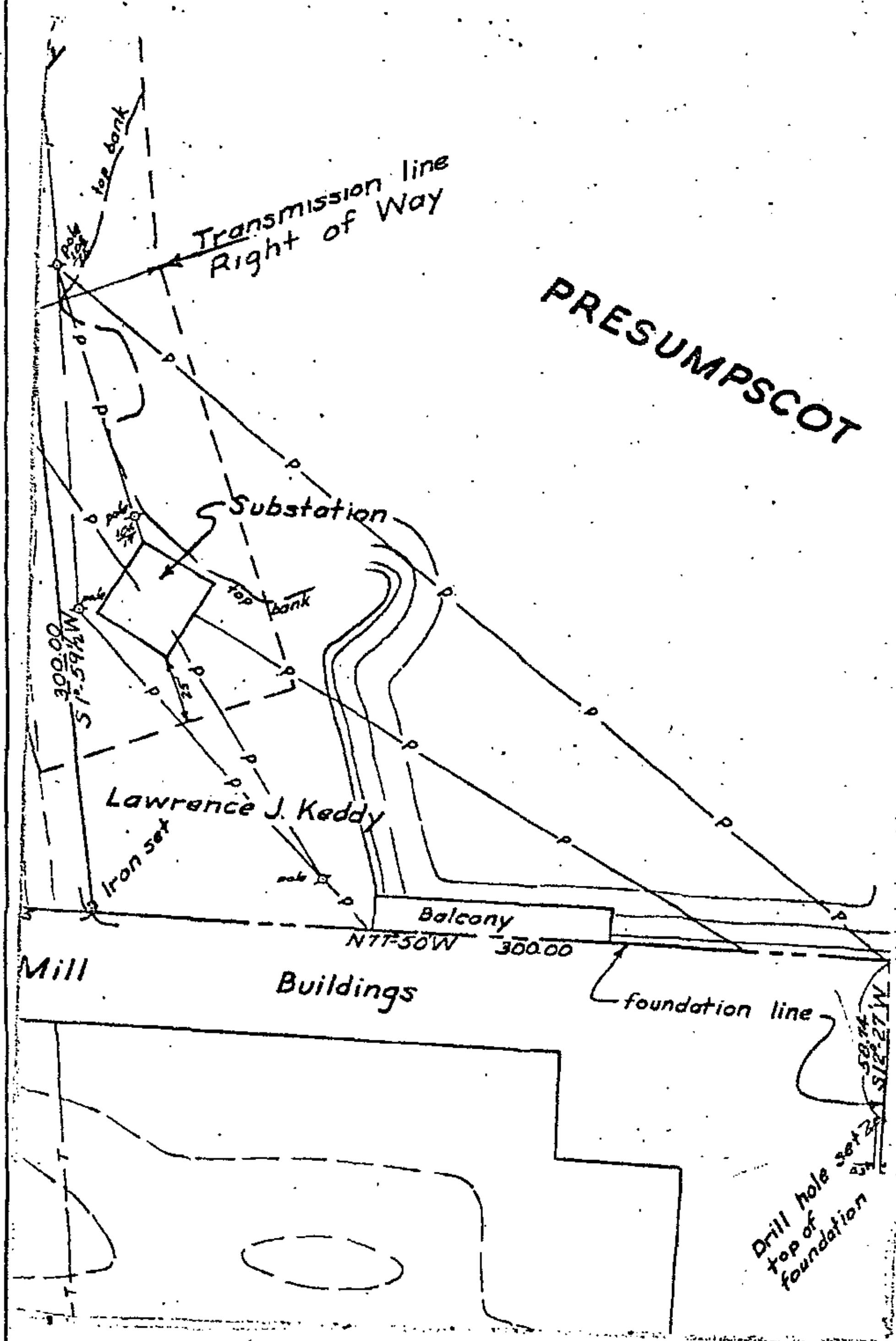
BEFORE ME,

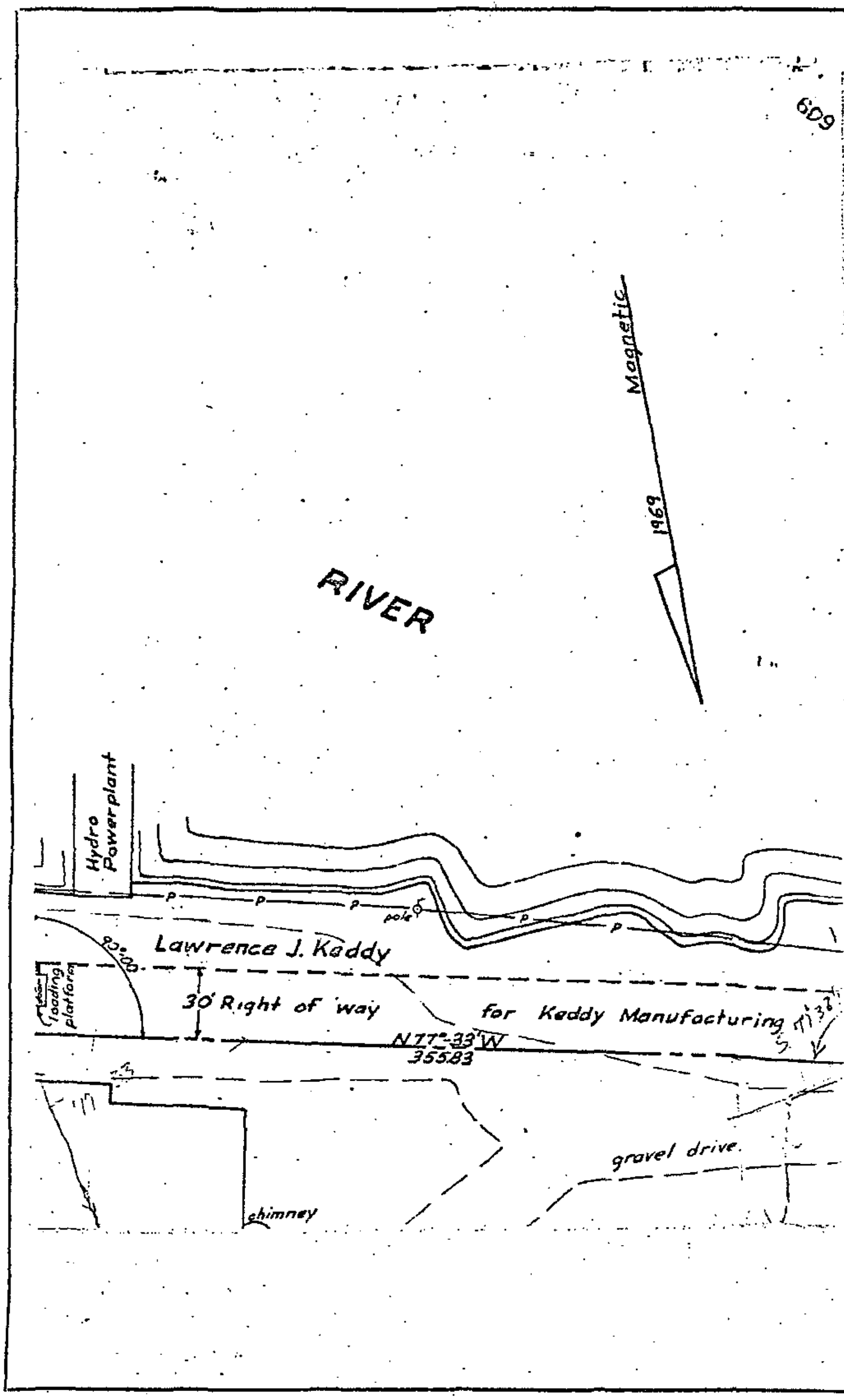
Elizabeth A. Waldo
Notary Public

My commission expires June 30, 1971

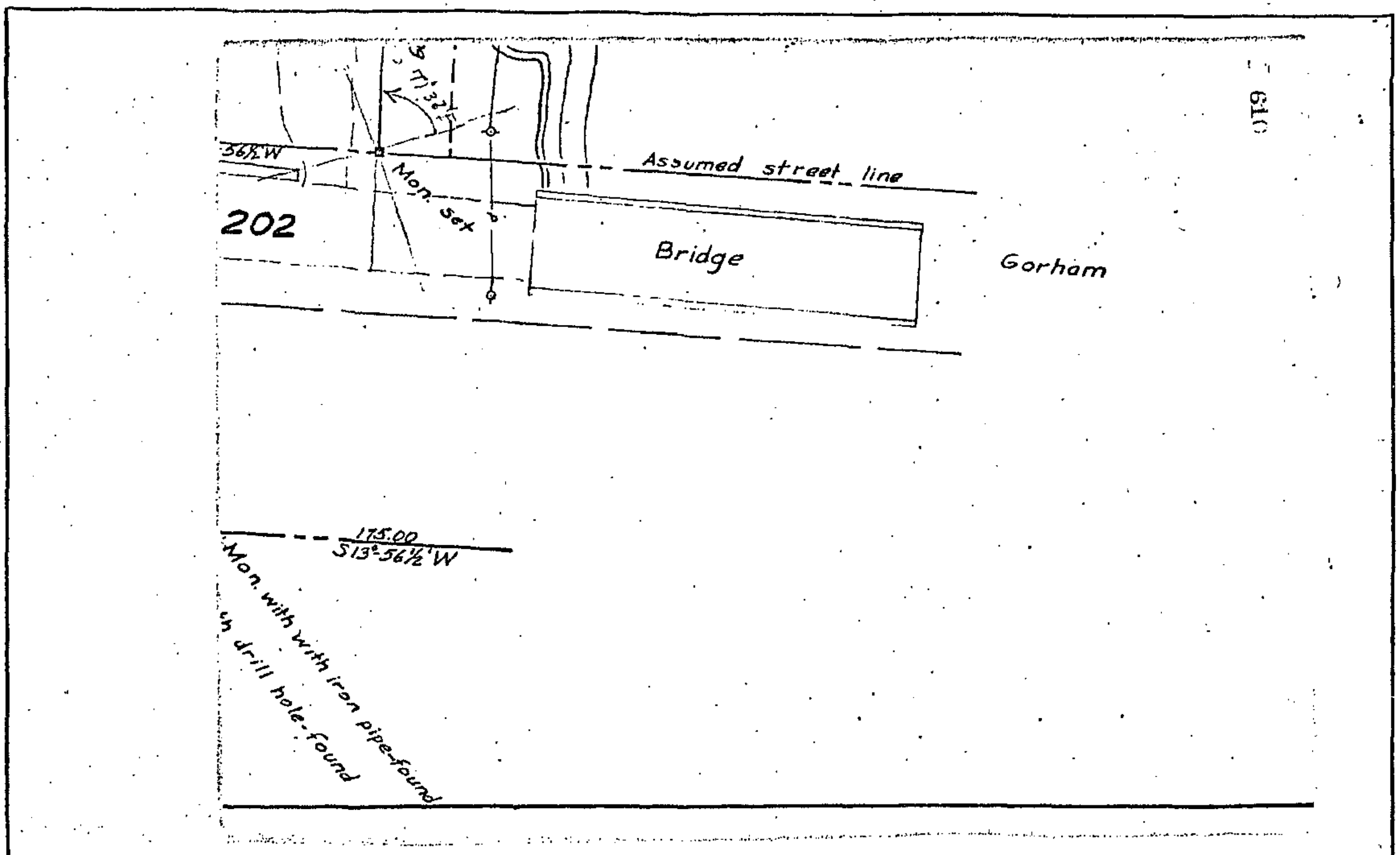


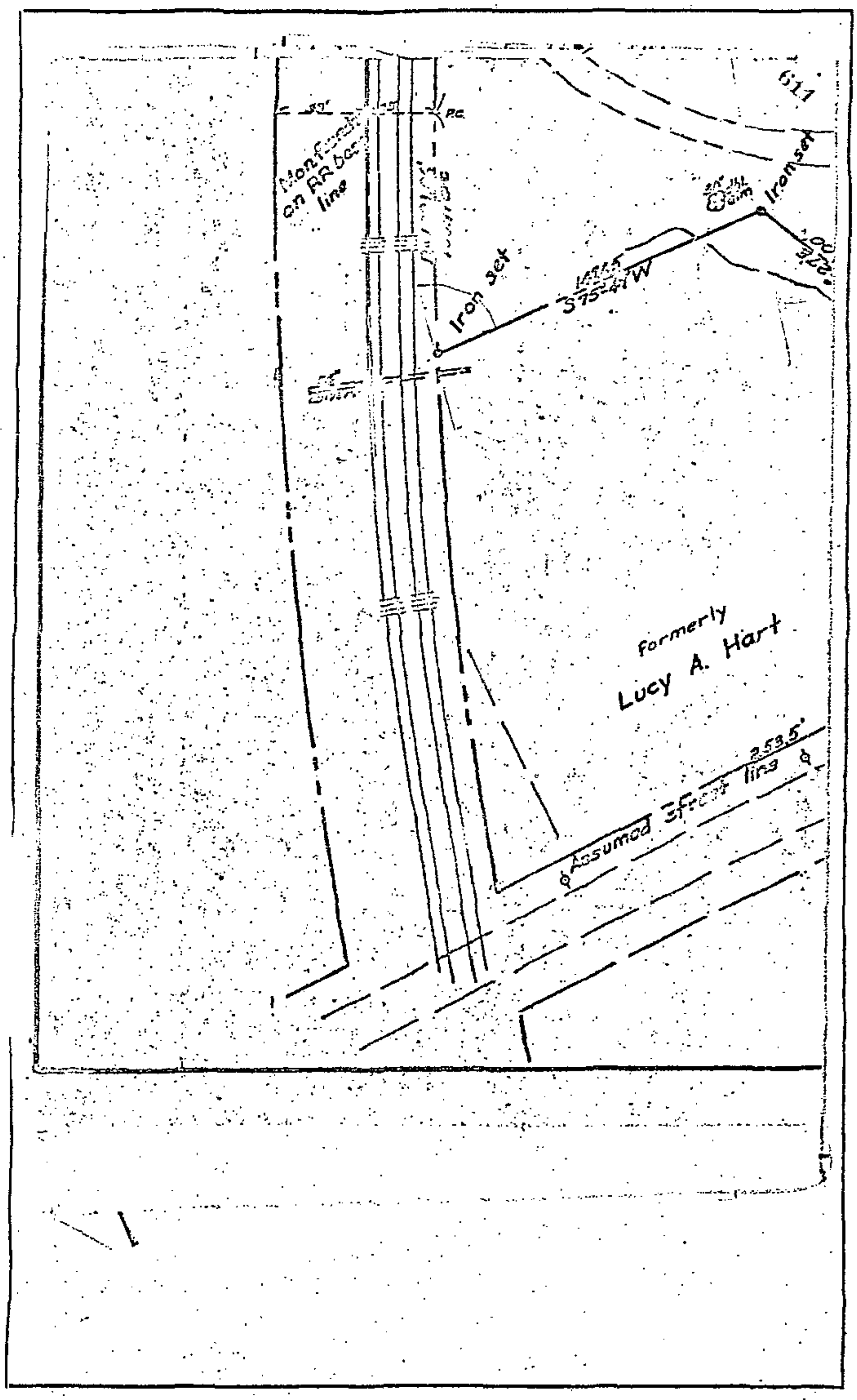
MAINE CENTRAL RAILROAD
Main track
Siding
S10°-10'W
471.36
gravel drive
Iron set
Siding
Lawrence J. Kedd
Mon. set
100'

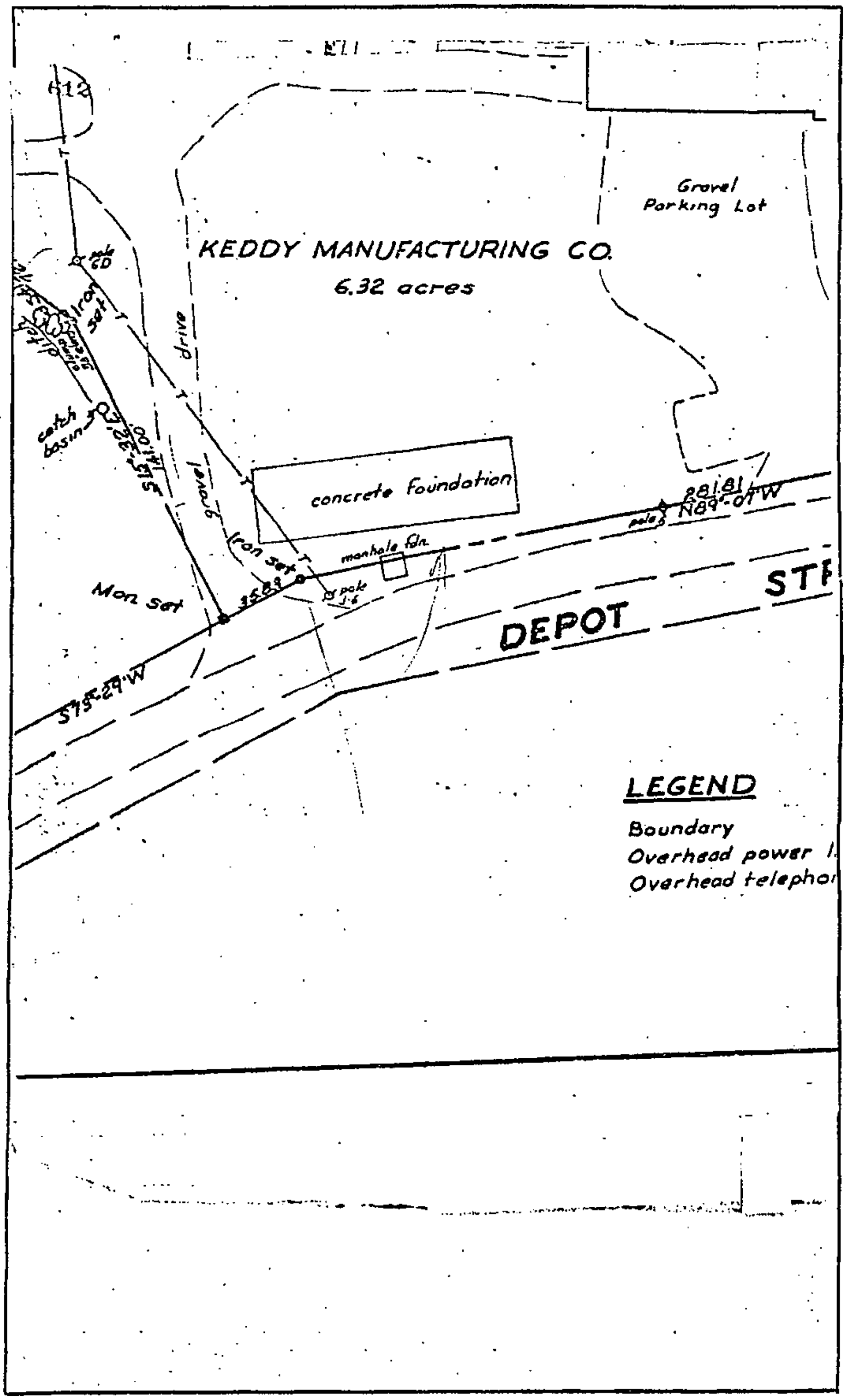

Transmission line
Right of Way
top bank
PRESUMPSCOT
Substation
top bank
300.00
S1°-59½W
Lawrence J. Keddy
Iron set
Balcony
N77-50W
300.00
Mill
Buildings
foundation line
58.14
S12°27'W
Drill hole set
top of
foundation



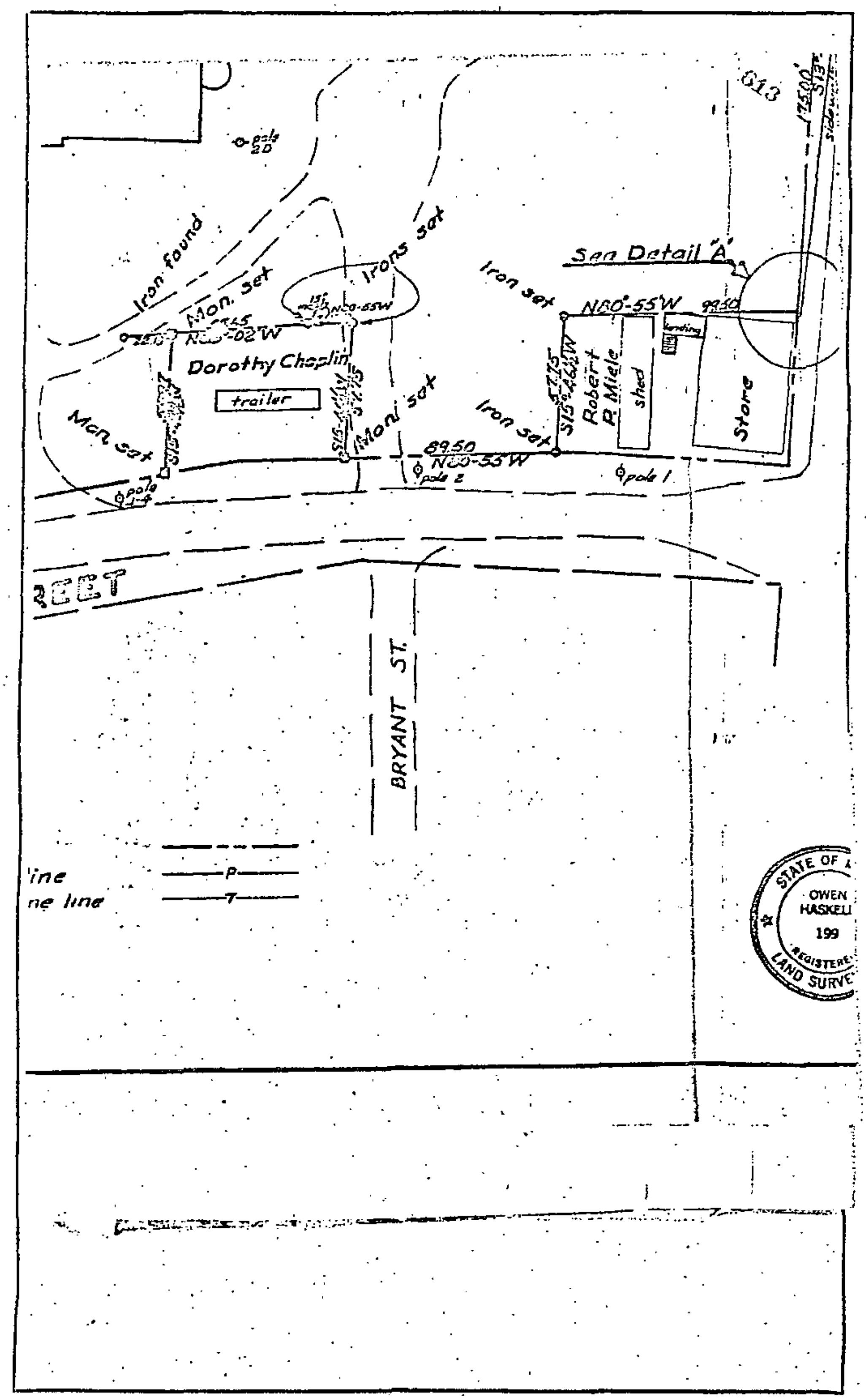
609
Magnetic
1969
RIVER
Hydro Powerplant
pole
Lawrence J. Keddy
loading platform
30' Right of way for Keddy Manufacturing
N77°-33'W
355.83
gravel drive.
chimney


36½'W
Assumed street line
Mon. Set
202
Bridge
Gorham
175.00
S13°56½'W
Mon. with with iron pipe-found
drill hole-found

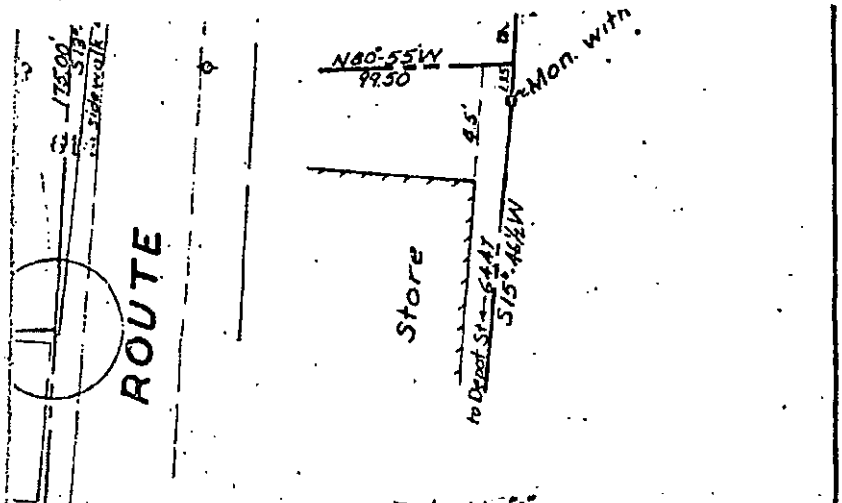

611
Mon found on RR base line
Iron set
148.65
S 75-41 W
Iron set
Formerly
Lucy A. Hart
253.5'
Assumed Street line



612
KEDDY MANUFACTURING CO.
6.32 acres
Gravel Parking Lot
drive
gravel
concrete foundation
catch basin
Iron set
manhole fdn.
pole
Mon set
S75°29'W
S15°32'00"W
N89°07'W
DEPOT STR
LEGEND
Boundary
Overhead power l
Overhead telephon



613
175.00'
S13°
Iron found
Mon. set
Irons set
Iron set
N80°-55'W
99.50
See Detail "A"
Dorothy Chaplin
trailer
Mon. set
Robert R Miele
shed
Store
89.50
N80-55'W
pole 1
pole 2
REET
BRYANT ST.
line
ne line
STATE OF
OWEN HASKELL
199
REGISTERED LAND SURVEYOR



PLAN OF LAND
in
SOUTH WINDHAM, MAINE
for
GRINNELL COMPANY INC

Owen Haskell, Inc.
Civil Engineers *Land Surveyors*
South Portland, Maine

Drawn By SSS	Date July 14, 1969	Job No 6931Wi
Trace By OH		
Check By OH	Scale 1" = 40'	Dwg No
Bk No 15/2		

STATE OF MAINE
OWEN HASKELL
199
REGISTERED LAND SURVEYOR

STATE OF MAINE

CUMBERLAND, ss. REGISTRY OF DEEDS

Received at 9 H. — M. A. M. on NOV 28 1969 and recorded in Book 3110 Page 603

Attest Leonard T. Flynn Register

20412

KNOW ALL MEN BY THESE PRESENTS,

THAT ITT GRINNELL CORPORATION, formerly known as GRINNELL CORPCRATION, a corporation organized and existing under the laws of the State of Delaware and located at Providence in the County of Providence and State of Rhode Island, in consideration of One Dollar ($1.00) and other valuable considerations paid by PARK CORPORATION, a corporation organized and existing under the laws of the State of Nevada and located at 3100 MacCorkle Avenue SW., So. Charleston in the County of Kanawha and State of West Virginia, the receipt whereof it does hereby acknowledge, does hereby GIVE, GRANT, BARGAIN, SELL AND CONVEY, unto the said PARK CORPCRATION, its successors and assigns forever, a certain lot or parcel of land with the buildings thereon, situated in the Town of Windham, County of Cumberland and State of Maine bounded and described as follows:

Beginning at a point (marked by a monument set) on the easterly side line of Main Street (Route #202), which point is located One Hundred Seventy-five (175) feet southerly along said easterly side line of Main Street from the southwesterly corner of land now or formerly owned by Robert P. Miele, et al; thence South 77° 33' East Three Hundred Fifty-five and Eighty-three Hundredths (355.83) feet on a course which intersects the face of the westerly foundation of the main factory building situated on the land herein conveyed at a right angle thereto at a point (marked by a drill hole set); thence South 12° 27' West along the said face of the westerly foundation Fifty-eight and Seventy-four Hundredths (58.74) feet to a corner of said foundation; thence South 77° 50' East by the face of the southerly foundation of said building a distance of Three Hundred (300) feet to a point (marked by an iron set); thence South 1° 59-1/2' West Three Hundred (300) feet to a point (marked by a monument set) which is located One Hundred Fifty (150) feet westerly of land now or formerly of the Maine Central Railroad, said distance being measured at a right angle to the westerly boundary of said Railroad land; thence South 79° 49-1/2' East One Hundred Fifty (150) feet to a point on said westerly Railroad boundary (marked by an iron set); thence North 10° 10-1/2' East by said Railroad land a distance of Four Hundred Seventy-one and Thirty-six Hundredths (471.36) feet to a point; thence northerly along said Railroad boundary along an arc having a radius of One Thousand Eight Hundred Eighty-one and Eighty-six Hundredths (1881.86) feet One Hundred and Ninety-seven Hundredths (100.97) feet to a point (marked by an iron set) on the southeasterly corner of

land now or formerly of the Hart heirs; thence South 75° 49' West by said land of the Hart heirs One Hundred Forty-seven and Sixty-five Hundredths (147.65) feet to the southerly corner of said land of the Hart heirs (marked by an iron set); thence North 41° 27' West Seventy-two (72) feet to a southwesterly corner of the land of the Hart heirs (marked by an iron set); thence North 15° 32' West One Hundred Forty-one (141) feet to the northwesterly corner of the land of the Hart heirs on the southerly side of Depot Street (marked by a monument set); thence South 73° 29' West Thirty-five and Eighty-three Hundredths (35.83) feet along the southerly side of Depot Street to a point (marked by an iron set); thence North 89° 7' West Two Hundred Eighty-one and Eighty-one Hundredths (281.81) feet to the northeasterly corner of land now or formerly owned by Dorothy Chaplin (marked by a monument set); thence South 15° 46-1/2' West Fifty-nine and Ninety-seven Hundredths (59.97) feet to the southeasterly corner of said Chaplin land (marked by a monument set); thence North 83° 2' West Fifty-five and Sixty-five Hundredths (55.65) feet to a southerly corner of said Chaplin land (marked by an iron set); thence North 80° 55' West Eighteen and Ninety Hundredths (18.90) feet to the southwesterly corner of said Chaplin land (marked by an iron set); thence North 15° 46-1/2' East Fifty-seven and Seventy-five Hundredths (57.75) feet to the northwesterly corner of said Chaplin land on the southerly side line of Depot Street (marked by a monument set); thence North 80° 55' West Eighty-nine and Fifty Hundredths (89.50) feet to the northeasterly corner of land now or formerly of Robert P. Miele (marked by an iron set); thence South 15° 46-1/2' West Fifty-seven and Seventy-five Hundredths (57.75) feet to the southeasterly corner of said Miele land (marked by an iron set); thence North 80° 55' West Ninety-nine and Fifty Hundredths (99.50) feet to the southwesterly corner of said land of Robert P. Miele on the easterly side line of Main Street; thence South 13° 56-1/2' West One Hundred Seventy-five (175) feet to the point of beginning; together with all the Grantor's right, title, and interest in and to the land extending to the Central Line of all streets or roads adjoining said premises.

The above described premises are those conveyed to the Grantor herein under its former name "Grinnell Corporation" by Keddy Manufacturing Co. by deed dated October 17, 1969 and recorded in Cumberland County Registry of Deeds in Book 3110, Page 603, and are shown on "PLAN OF LAND IN SOUTH WINDHAM, MAINE" by Owen Haskell, Inc., of South Portland, Maine, dated July 14, 1969, which plan is attached to said deed to the Grantor herein and recorded at pages 607-614 of said Book 3110.

Also conveyed herewith is right to have the office balcony which is now next to the face of the southerly wall of the main factory building project over the

land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy.

Also conveyed herewith and appurtenant to the above described premises is a right-of-way for vehicles and pedestrians Thirty (30) feet in width over the land formerly owned by Atlantic Mills, Inc. and now or formerly owned by Lawrence J. Keddy extending easterly from the easterly side of Main Street (Route #202) at the point of beginning of the above described premises to a doorway located in the westerly foundation of the main factory building.

This conveyance is made subject to Maine Central Railroad side track agreements.

This conveyance is also made subject to a right-of-way conveyed by Cumberland Securities Corporation to Central Maine Power Company by deed dated October 6, 1944, recorded in the Cumberland County Registry of Deeds, Book 1759, Page 348 and also subject to electrical distribution line rights-of-way as they may pertain to the above described premises reserved in the Deed *of Cumberland Securities Corporation to Windham Fibres*, Inc. dated July 25, 1945 recorded in said Registry of Deeds Book 1787, Page 353.

The above described premises are the premises conveyed by Atlantic Mills, Inc. to Keddy Manufacturing Co. by deed dated June 6, 1961, recorded in said Registry of Deeds Book 2611, Page 192.

This conveyance is made subject to real estate taxes for 1973 which the Grantee herein assumes and agrees to pay.

TO HAVE AND TO HOLD the aforegranted and bargained premises with all the privileges and appurtenances thereof to the said PARK CORPORATION, its successors and assigns, to its and their use and behoof forever.

AND the said Grantor Corporation does hereby COVENANT with the said Grantee, its successors and assigns, that it is lawfully seized in fee of the premises, that they are free of all encumbrances, that it has good right to sell and convey the same to the said Grantee to hold as aforesaid; and that it and its successors, shall and will WARRANT AND DEFEND the same to the said Grantee, its successors and assigns forever, against the lawful claims and demands of all persons, except as aforesaid.

IN WITNESS WHEREOF, the said ITT GRINNELL CORPORATION

has caused this instrument to be sealed with its corporate seal and signed in its corporate name by David D. McKenney its Vice President thereunto duly authorized, this 21st day of August in the year one thousand nine hundred and seventy-three.

Signed, Sealed and Delivered
in presence of

ITT GRINNELL CORPORATION

By _____
its _____

(Corporate Seal)

STATE OF RHODE ISLAND

COUNTY OF PROVIDENCE, ss. August, 21, 1973

Then personally appeared the above named David D. McKenney of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

_____
Notary Public

(Notarial Seal)

BARBARA J. BIRTWELL
NOTARY PUBLIC
MY COMMISSION EXPIRES JUNE 30, 1976

AUG 28 1973
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 11 H 43 M AM, and recorded in
BOOK 3450 PAGE 31 _____ Register

[illegible]

Form 7A—1M

MAINE CENTRAL RAILROAD COMPANY

305

It is mutually agreed by the MAINE CENTRAL RAILROAD COMPANY and Keddy Manufacturing Division of Grinnell Corporation, now ITT Grinnell Corporation

that two agreements between aforesaid parties dated June 25, 1971

and being the same agreements referred to in deeds recorded in Cumberland County Registry of Deeds in Book 2611, Page 192 and Book 3110, Page 603 and Book 3450, Page 31

covering Maintenance of 873 feet of Track 7 and a permit to operate overhead cranes over Track 7 in the Town of So. Windham, Maine, is hereby cancelled by mutual consent, effective as of August 28, 1973; provided, however, that any rights or liabilities accrued or accruing under the aforesaid agreement prior to the effective date of this cancellation shall be and remain in full force and effect.

This agreement executed in duplicate this 27th day of August, 1973

MAINE CENTRAL RAILROAD COMPANY,

Witness

By

Manager-Industrial Development, Real Estate and Taxation

Witness

ITT Grinnell Corporation

By

Its Vice President

Form approved

(See Acknowledgment on reverse side)

Execution approved

STATE OF RHODE ISLAND

COUNTY OF PROVIDENCE, ss. August 27 , 1973

Then personally appeared the above named David D. McKenney, Vice President of said Grantor Corporation as aforesaid, and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said corporation.

Before me,

[signature]

Notary Public

(Notarial Seal)

SEP 18 1973
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 9 H 24 M A.M. and recorded in
BOOK 3459 PAGE 305 [signature] Register

No Corp Seal

The debt secured by this mortgage has been fully paid and if, the within named mortgagee, does hereby discharge and release the within described premises from said mortgage and all claims under the same, this 13th day of Sept 19 73

CASCO BANK & TRUST COMPANY
PORTLAND, MAINE

By [signature]
Its Loan Operations Officer

(SEAL)

State of Maine }ss
County of Cumberland } Sept 13 1973

Personally appeared the above named Halina S. Love of said Casco Bank & Trust Company, and acknowledged the foregoing to be his free act and deed, and the free act and deed of said Casco Bank & Trust Company,

Before me,

[signature]
Notary Public

(SEAL)

MY COMMISSION EXPIRES JANUARY 17, 1980

RECORDED IN:
BOOK 3178
PAGE 650

SEP 18 1973
REGISTRY OF DEEDS, CUMBERLAND COUNTY, MAINE
Received at 9 H — M A.M. and recorded in
BOOK 3459 PAGE 306 [signature] Register

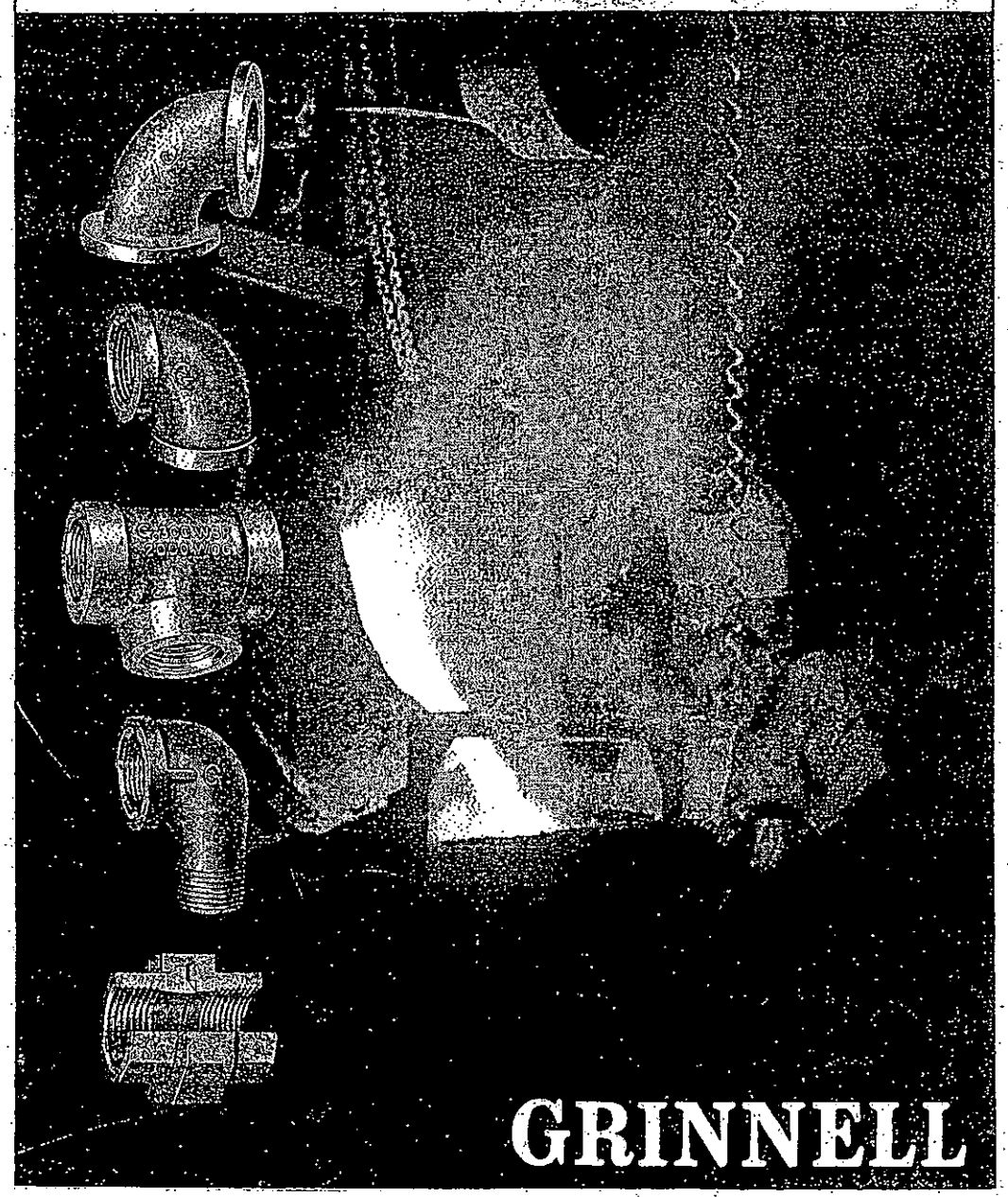
Endorsed on mortgage recorded in Book 3178 Page 650

10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

ITT Exhibit D: Grinnell Pipefittings Catalog 1972 (87 pages)

Catalog PF-72

Pipe Fittings
Cast Iron - Malleable - Steel



GRINNELL

pipe

fittings

catalog pf-72

conditions and terms of sale

1. Contracts are subject to strikes, accidents or other causes beyond our control.
2. We guarantee for one year from date of delivery our manufactured products to the extent that we will replace those having manufacturing defects when used for the purpose which we recommended. If goods are defective, the amount of damage is the price of the defective goods only and no allowance will be made for labor or expense of repairing defective goods or damage resulting from the same.

   We guarantee the products we sell of other manufacturers to the extent of the guaranties of their respective makers.

   No claims for shortages allowed unless made in writing within ten days of receipt of goods.
3. We cannot accept return of any goods unless our permission has been first obtained, in which case same will be credited subject to the following:
   (a) All material returned must on its arrival at our plants be found in first-class condition; if not, cost of putting in salable condition will be deducted from credit memoranda.
   (b) A handling charge deduction will be made from all credit memoranda issued for material returned.
   (c) Transportation charges, if not prepaid, will be deducted from credit memoranda.
4. All materials sent out will be carefully examined, counted and packed. Claims for goods damaged or lost in transit should be made on the carrier, as our responsibility ceases on delivery to the carrier.
5. Orders covering special or non-standard goods are not subject to cancellation except on such terms as we may specify on application.
6. Prices and designs subject to change without notice.
7. Terms: Cash unless otherwise agreed upon.

Sales Offices and Warehouses on back cover

malleable iron — 150 lb, standard

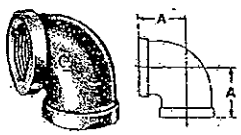
pressure ratings, psi { saturated steam: 150 / liquid & gas at 150° F: 300

Grinnell 150 lb standard weight malleable iron fittings conform to American National Standards: dimensions, ANSI B16.3; threads, ANSI B2.1; material, ASTM A-47 Grade 32510; hot dipped galvanizing, ASTM A153; dimensions also conform to Federal specifications WW-P-521e.

Grinnell standard weight banded pattern fittings in this catalog, sizes ⅛ to 6-inch inclusive, are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

elbows

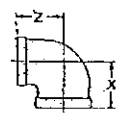
90° elbow: fig. 1101



A: center to end

size, in.	A in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.	size, in.	A in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.
⅛	11/16	.06	.07	2	2¼	2.03	2.10
¼	13/16	.11	.12	2½	2 13/16	3.72	3.81
⅜	15/16	.17	.18	3	3⅛	5.36	5.50
½	1⅛	.25	.26	3½	3 7/16	7.40	7.62
¾	1 5/16	.38	.40	4	3 13/16	9.70	9.85
1	1½	.64	.67	5	4½	15.20	15.45
1¼	1¾	1.01	1.04	6	5¼	23.00	23.80
1½	1 15/16	1.33	1.36				

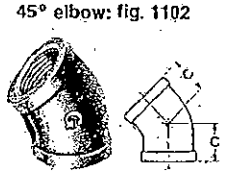
reducing elbow fig. 1101B



X and Z: center to end

size, in.		X in.	Z in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼	⅛	⅜	⅜	.09	.10
⅜	¼	⅜	15/16	.14	.15
	⅛	13/16	⅞	.12	.13
½	⅜	1 1/16	1⅛	.21	.22
	¼	1	1	.18	.19
¾	½	1 3/16	1¼	.33	.34
	⅜	1⅛	1⅛	.31	.32
	¼	1⅛	1⅛	.27	.28
1	¾	1⅜	1 7/16	.50	.52
	½	1¼	1¾	.44	.46
	⅜	1 13/16	1¼	.41	.43
1¼	1	1 5/16	1 11/16	.78	.81
	¾	1⅜	1⅝	.68	.71
	½	1⅜	1⅜	.62	.64
1½	1¼	1 13/16	1⅞	1.08	1.12
	1	1⅝	1 13/16	.93	.97
	¾	1½	1¾	.87	.90
2	1½	2	2⅛	1.65	1.68
	1¼	1⅞	2⅛	1.60	1.63
	1	1¾	2	1.36	1.43
	¾	1⅝	2	1.26	1.30
2½	2	2 1/16	2⅝	2.85	2.95
	1½	2⅜	2½	2.45	2.55
3	2½	2 11/16	3	4.70	4.85
	2	2⅝	2 15/16	4.00	4.10
4	3	3⅜	3⅜	7.85	8.15

45° elbow: fig. 1102

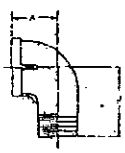


C: center to end

size, in.	C in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.	size, in.	C in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.
⅛	11/16	.07	.08	2	1 11/16	1.75	1.82
¼	¾	.11	.12	2½	1 15/16	2.97	3.07
⅜	13/16	.15	.16	3	2⅛	4.65	4.75
½	⅞	.22	.23	3½	2⅜	5.92	6.03
¾	1	.34	.36	4	2⅝	7.62	7.85
1	1⅛	.57	.59	5	3⅛	12.10	12.50
¼	1 5/16	.84	.88	6	3⅜	18.20	18.60
½	1⅜	1.14	1.17				

elbows, *cont'd*

90° street elbow
straight: **fig. 1103**
reducing: **fig. 1103R**

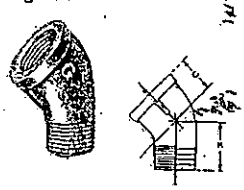


A: center to end
J: center to male end

first size mentioned denotes female end

size, in.		A in.	J in.	weight (approx) each, lb	
				black	galvanized
⅛		11/16	1	.06	.07
¼		13/16	1 3/16	.10	.11
⅜		15/16	1 7/16	.17	.18
½		1 1/16	1 5/8	.25	.26
¾		1 5/16	1 7/8	.40	.42
1		1½	2 3/16	.65	.68
1¼		1 3/4	2 5/16	1.08	1.11
1½		1 15/16	2 9/16	1.46	1.50
2		2¼	3¼	2.34	2.40
2½		2 11/16	3 7/8	4.11	4.15
3		3 1/16	4½	6.59	6.63
4		3 15/16	5 11/16	10.88	11.09
½	⅜	1 1/16	1 5/16	.24	.25
¾	½	1 5/16	1¾	.34	.36
1	¾	1 5/8	2 1/16	.54	.56
1¼	1	1 13/16	2 5/16	.86	.88
	¾	1 7/16	2¼	.75	.77
1½	1¼	1 15/16	2 5/16	1.18	1.22
	1	1 7/8	2½	1.05	1.10
	¾	1½	2 3/8	.96	.98
2	1½	2	2 15/16	1.82	1.86

45° street elbow
fig. 1104

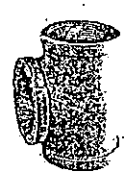


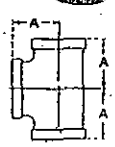
C: center to end
K: center to male end

size, in.	C in.	K in.	weight (approx) each, lb	
			black	galvanized
⅛	11/16	7/8	.06	.07
¼	¾	15/16	.10	.11
⅜	13/16	1	.12	.13
½	⅞	1 1/16	.22	.23
¾	1	1 1/16	.34	.36
1	1 1/16	1 1/16	.54	.56
1¼	1 5/16	1 13/16	.85	.88
1½	1 7/16	1 7/8	1.21	1.24
2	1 11/16	2¼	1.95	2.01

tees

straight tee
fig. 1105



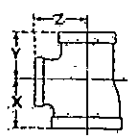


A: center to end

size, in.	A in.	weight (approx) each, lb	
		black	galvanized
⅛	9/16	.09	.10
¼	11/16	.15	.16
⅜	13/16	.25	.26
½	1¾	.34	.36
¾	1 15/16	.54	.56
1	1½	.90	.93
1¼	1¾	1.36	1.40
1½	1 15/16	1.81	1.85
2	2¼	2.72	2.81
2½	2 11/16	4.92	5.05
3	3 1/16	7.59	7.77
3½	3 7/16	9.40	9.46
4	3 15/16	13.83	14.07
5	4½	19.40	20.30
6	5 1/16	28.10	28.60

tees, cont'd.

reducing tee, fig. 1105R

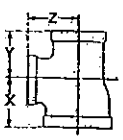


X, Y, Z: center to end

size, in.			X in.	Y in.	Z in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼	¼	⅛	¾	¾	¾	.13	.14
⅛	⅛	¼	¾	¾	¾	.12	.13
⅜	⅜	¼	⅞	⅞	1 5/16	.21	.22
⅜	¼	⅜	1 5/16	1 5/16	1 5/16	.21	.22
		¼	⅞	1 3/16	1 5/16	.19	.20
¼	¼	⅜	1 5/16	1 5/16	⅞	.19	.20
½	½	⅜	1 1/16	1 1/16	1 1/16	.31	.33
		¼	1	1	1	.27	.28
½	⅜	½	1 1/16	1 1/16	1 1/16	.31	.33
		⅜	1 1/16	1	1 1/16	.28	.33
	½	½	1 1/8	1	1 1/8	.29	.31
⅜	⅜	½	1 1/16	1 1/16	1 1/16	.28	.29
¾	¾	½	1 3/16	1 3/16	1 1/4	.47	.49
		⅜	1 1/16	1 1/8	1 1/8	.43	.45
		¼	1 1/16	1 1/16	1 1/8	.41	.43
¾	½	¾	1 3/16	1 1/4	1 5/16	.48	.51
		½	1 1/16	1 1/8	1 1/4	.42	.44
	⅜	¾	1 5/16	1 1/8	1 1/16	.46	.48
		⅜	1 1/8	1 5/16	1 1/8	.36	.37
	¼	¾	1 3/16	1 1/8	1 3/16	.44	.46
½	½	¾	1 1/4	1 1/4	1 3/16	.43	.45
1	1	¾	1 3/8	1 3/8	1 1/16	.72	.75
		½	1 1/4	1 1/4	1 3/8	.68	.70
		⅜	1 3/16	1 3/16	1 1/4	.60	.63
		¼	1 1/8	1 1/8	1 1/4	.57	.60
	¾	1	1 1/2	1 3/16	1 1/2	.75	.78
		¾	1 3/8	1 5/16	1 3/16	.62	.65
		½	1 1/4	1 3/16	1 3/8	.58	.61
	½	1	1 1/2	1 3/8	1 1/2	.70	.73
		¾	1 3/8	1 1/4	1 3/16	.61	.64
		½	1 1/4	1 1/8	1 3/8	.52	.55
	¼	1	1 1/2	1 5/16	1 1/2	.71	.74
¾	¾	1	1 3/16	1 3/16	1 3/8	.65	.68
½	½		1 3/8	1 3/8	1 1/4	.57	.60
1¼	1¼	1	1 3/16	1 3/16	1 5/16	1.13	1.17
		¾	1 1/16	1 3/16	1 1/8	.97	1.00
		½	1 3/16	1 3/16	1 3/16	.92	.95
		⅜	1 1/4	1 1/4	1 3/16	.87	.89
	1	1¼	1 3/4	1 11/16	1 3/4	1.17	1.20
		1	1 3/16	1 1/2	1 11/16	1.01	1.04
		¾	1 3/16	1 3/16	1 3/16	.87	.91
		½	1 3/16	1 1/4	1 3/16	.82	.84
	¾	1¼	1 3/4	1 5/8	1 3/4	1.10	1.15
		1	1 3/16	1 3/16	1 11/16	.98	1.02
		¾	1 1/16	1 3/16	1 1/8	.83	.86
	½	1¼	1 3/4	1 3/16	1 3/4	1.04	1.08
		1	1 3/16	1 3/4	1 11/16	.98	1.01
1	1	1¼	1 11/16	1 11/16	1 3/16	1.01	1.06
¾	¾		1 5/8	1 3/4	1 1/16	.93	.97
1½	1½	1¼	1 11/16	1 11/16	1 1/8	1.51	1.57
		1	1 3/16	1 3/16	1 11/16	1.48	1.53
		¾	1 1/2	1 1/2	1 3/4	1.24	1.28
		½	1 3/16	1 3/16	1 11/16	1.16	1.19
	1¼	1½	1 11/16	1 1/8	1 11/16	1.56	1.62
		1¼	1 11/16	1 3/4	1 1/8	1.50	1.55
		1	1 5/8	1 3/16	1 11/16	1.26	1.32
		¾	1 1/2	1 3/16	1 3/4	1.15	1.18
		½	1 1/16	1 3/8	1 11/16	1.18	1.22

tees, *cont'd*

reducing tee, *cont'd*
fig. 1105R



X, Y, Z: center to end

size, in.			X in.	Y in.	Z in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
1½	1	1½	1 15/16	1 13/16	1 15/16	1.48	1.54
		1¼	1 13/16	1 11/16	1 7/8	1.39	1.44
		1	1 5/8	1½	1 11/16	1.17	1.21
	¾	1½	1 15/16	1¾	1 15/16	1.37	1.44
	¾	¾	1½	1 13/16	1¾	1.00	1.03
	½	1½	1 15/16	1 11/16	1 15/16	1.37	1.42
1¼	1¼	1½	1¾	1 7/8	1 13/16	1.45	1.52
1	1		1 13/16	1 13/16	1 5/8	1.21	1.26
2	2	1½	2	2	2 3/16	2.27	2.35
		1¼	1 7/8	1 7/8	2 1/8	2.10	2.16
		1	1¾	1¾	2	2.03	2.09
		¾	1 5/8	1 5/8	2	1.74	1.80
		½	1½	1½	1 7/8	1.70	1.76
	1½	2	2¼	2 3/16	2¼	2.40	2.48
		1½	2	1 15/16	2 3/16	2.02	2.10
		1¼	1 7/8	1 13/16	2 1/8	1.86	1.94
		1	1¾	1 5/8	2	1.64	1.74
	1¼	2	2¼	2¼	2¼	2.32	2.39
		1½	2	1 7/8	2 3/16	1.94	2.00
		1¼	1 7/8	1¾	2 1/8	1.76	1.84
	1	2	2¼	2	2¼	2.20	2.28
	¾	2	2¼	1 15/16	2¼	2.16	2.24
	½	2	2¼	1 7/8	2¼	2.18	2.28
1½	1½	2	2 3/16	2 3/16	2	2.01	2.07
1¼	1¼		2 1/8	2 1/8	1 7/8	1.80	1.84
1	1		2	2	1¾	1.63	1.66
2½	2½	2	2 3/8	2 3/8	2 5/8	4.00	4.12
		1½	2 3/16	2 3/16	2 1/2	3.52	3.66
		1¼	2 1/16	2 1/16	2 3/16	3.32	3.44
		1	1 7/8	1 7/8	2 3/16	3.08	3.20
		¾	1¾	1¾	2 1/16	2.89	3.00
	2	2½	2 13/16	2 5/8	2 13/16	4.18	4.30
		2	2 3/8	2¼	2 5/8	3.50	3.60
	1½	2½	2 13/16	2½	2 13/16	3.81	3.95
		2	2 3/8	2 3/16	2 5/8	3.78	3.84
2	2	2½	2 5/8	2 5/8	2 3/8	3.50	3.60
3	3	2½	2 13/16	2 13/16	3	6.10	6.25
		2	2½	2½	2¼	5.40	5.60
		1½	2 5/16	2 5/16	2 13/16	4.92	5.04
		1¼	2 1/16	2 1/16	2¾	4.70	4.85
		1	2	2	2 5/8	4.32	4.44
		¾	1 7/8	1 7/8	2 5/8	4.15	4.25
	2½	2½	2 13/16	2 13/16	3	5.80	5.95
		2	2½	2 3/8	2 5/8	6.32	6.47
	2	3	3 1/16	2 7/8	3 1/16	6.10	6.30
		2	2½	2¼	2 7/8	4.30	4.45
2½	2½	3	3	3	2 13/16	5.80	6.00
4	4	3	3 3/16	3 1/16	3 5/8	10.53	10.77
		2½	3 1/16	3 1/16	3½	10.00	10.21
		2	2¾	2¾	3 3/16	8.42	8.67
		1½	2½	2½	3 3/16	7.45	7.65
	3	4	3 13/16	3 5/8	3 13/16	11.50	12.00
3	3	4	3 5/8	3 5/8	3 5/8	9.20	9.40
6	6	4	4 1/16	4 1/16	4 15/16	22.40	23.40
		3	3 5/8	3 5/8	4¾	19.30	20.30
		2½	3¼	3¾	4 11/16	17.50	18.50
		2	3 1/16	5 1/16	4 5/16	16.40	17.00

tees, *cont'd*

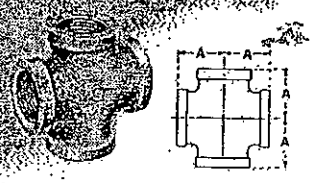
street or service tee
straight: fig. 1106
reducing: fig. 1106R

size, in.	A in.	J in.	weight (approx) each, lb. black	galvanized
¼	7/16	1 3/16	.13	.14
⅜	7/16	1 7/16	.25	.26
½	1 1/16	1 5/16	.32	.34
¾	1 5/16	1 1/8	.54	.57
1	1 1/2	2 1/16	.81	.86
1¼	1 3/4	2 5/16	1.24	1.28
1½	1 15/16	2 11/16	1.76	1.81
2	2 1/4	3 1/4	2.68	2.75

size, in.			run A in.	run J in.	outlet A in.	wgt (approx) each, lb. black
1	1	¾	1 3/8	2	1 7/16	.78
1¼	1	1¼	1 3/4	2 5/16	1 3/4	1.14
		1	1 11/16	2 1/16	1 11/16	1.09
	¾	1¼	1 3/4	2 1/2	1 3/4	1.11
1½	1	1¼	1 11/16	2 5/16	1 7/8	1.18
	1¼	1½	1 15/16	2 7/8	1 15/16	1.51
	1	1½	1 15/16	2½	1 15/16	1.58
2	2	1	....	....	....	3.85
	1½	2	2¼	2 15/16	2¼	2.89

crosses

fig. 1107

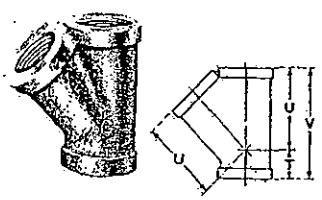


A: center to end

size, in.	A in.	weight (approx) each, lb. black	galvanized
¼	7/16	.12	.13
⅜	7/16	.18	.20
½	9/16	.29	.30
¾	1 1/16	.41	.43
1	1 5/16	.66	.68
1¼	1½	1.02	1.05
1½	1¾	1.53	1.57
2	1 15/16	2.02	2.10
2½	2¼	3.07	3.15
3	2 11/16	5.50	5.75
3½	3 1/16	8.25	8.55
4	3 7/16	10.60	11.00
5	4 1/16	13.50	14.00
6	4½	22.00	22.60
	5 1/16	32.63	33.50

lateral

45° Y-branch or lateral: fig. 1108

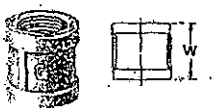


T, U: center to end
V: end to end

size, in.	T in.	U in.	V in.	weight (approx) each, lb. black	galvanized
⅜	½	1 1/16	1 3/16	.28	.29
½	⅝	1 11/16	2 1/16	.38	.39
¾	¾	2 1/16	2 1/16	.62	.65
1	⅞	2 5/16	3 3/16	.94	.99
1¼	1	2 15/16	3 15/16	1.57	1.63
1½	1 1/16	3¼	4 3/16	2.06	2.15
2	1¼	3 15/16	5 3/16	3.33	3.40
2½	1½	4¾	6½	6.00	6.12
3	1 15/16	5 5/16	7¼	9.30	9.50
4	2	7	9	16.14	16.30

couplings

right hand
fig. 1121

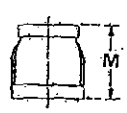


W: end to end

size, in.	W in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
⅛	15/16	.05	.06
¼	1 1/16	.08	.09
⅜	1 3/16	.12	.13
½	1 5/16	.18	.19
¾	1½	.28	.29
1	1 11/16	.44	.46
1¼	1 15/16	.66	.68
1½	2 1/16	.91	.93
2	2½	1.45	1.48
2½	2 7/8	2.50	2.54
3	3 3/16	3.65	3.72
4	3 11/16	5.90	6.20

reducer

fig. 1125



M: end to end

size, in.		M in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼	⅛	1	.07	.07
⅜	¼	1 1/16	.11	.12
	⅛		.10	.11
½	¾	1¼	.16	.17
	¼		.15	.16
	⅛		.14	.15
¾	½	1 5/16	.25	.26
	⅜		.24	.25
	¼		.22	.23
	⅛		.24	.25
1	¾	1 11/16	.42	.44
	½		.38	.40
	⅜		.37	.39
	¼		.36	.38
1¼	1	2 1/16	.66	.68
	¾		.60	.62
	½		.57	.59
1½	1¼	2 5/16	.90	.92
	1		.83	.85
	¾		.79	.81
	½		.77	.78
2	1½	2 11/16	1.41	1.47
	1¼		1.40	1.45
	1		1.34	1.37
	¾		1.28	1.34
	½		1.24	1.29
2½	2	3¼	2.44	2.48
	1½		2.28	2.32
	1¼		2.24	2.28
	1		2.17	2.20
3	2½	3 11/16	3.77	3.87
	2		3.45	3.50
	1½		3.28	3.32
	1¼		3.22	3.28
	1		3.20	3.24
3½	3	4	5.05	5.15
	2½		4.72	4.80
	2		4.32	4.40
4	3½	4 5/8	6.60	6.80
	3		6.20	6.30
	2½		5.90	6.20
	2		5.80	6.00
	1½		5.95	6.15
5	4	4 13/16	9.85	10.10
6	4	4 15/16	12.70	13.00

malleable iron — 150 lb, standard

pressure ratings, psi { saturated steam: 150 / liquid & gas at 150° F: 300

return bends

close pattern, r.h. fig. 1117

medium pattern, r.h. fig. 1118

size, in.	center to center, in. fig. 1117	wgt (approx) each, lb black	wgt (approx) each, lb galv.	center to center fig. 1118	wgt (approx) each, lb. black
½	1	.29	.31	1¼	.34
¾	1¼	.49	.51	1½	.58
1	1½	.80	.81	1⅞	.97
1¼	1¾	1.22	1.26	2¼	1.54
1½	2⅛	1.82	1.92	2½	2.07
2	2⅜	3.07	3.17	3	3.40

open pattern, r.h. fig. 1119

size, in.	center to center, in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
½	1½	.37	.38
¾	2	.66	.68
1	2½	1.17	1.20
1¼	3	1.80	1.90
1½	3½	2.55	2.70
2	4	4.15	4.30
2½	4½	6.60	6.80
3	5	9.75	10.20
4	6	18.55	19.20

cap

fig. 1124

size, in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.	size, in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.
⅛	.03	.04	2	.95	.99
¼	.06	.06	2½	1.74	1.77
⅜	.09	.10	3	2.60	2.65
½	.14	.15	3½	3.16	3.24
¾	.22	.23	4	4.26	4.42
1	.33	.35			
1¼	.54	.56	5	6.65	6.83
1½	.68	.71	6	9.70	9.90

hex locknut

fig. 1134

for sizes larger than 2 in., see cast iron standard

size, in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.	size, in.	wgt (approx) each, lb black	wgt (approx) each, lb galv.
⅛	.04	.04	1	.17	.18
¼	.04	.04	1¼	.28	.29
⅜	.04	.05	1½	.35	.36
½	.06	.07			
¾	.12	.13	2	.50	.51

floor flange

fig. 1190

size, in.	diam. of flange, in.	diam. of bolt circle	no. of holes	diam. of holes	wgt (approx) each, lb black	wgt (approx) each, lb galv.
⅛ ◇	2¾	1⅞	4	¼	.27	.43
¼ ◇	3	2	4	¼	.33	.48
½	3½	2½	4	¼	.70	.72
¾	3½	2½	4	¼	.79	.81
1	4	3	4	¼	1.12	1.14
1¼	4	3	4	½	1.13	1.15
1½	4½	3½	4	⅝	1.59	1.61
2	5½	4¼	4	⅝	2.27	2.29

◇ cast iron

plain fittings

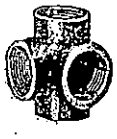
Not recommended for pressure service

90° elbow
fig. 1156

side outlet elbow
fig. 1109

tee: fig. 1157

side outlet tee
fig. 1113



waste nut
fig. 1133

extension piece
fig. 1137

size, in.	weight (approx) each, lb black	size, in.	weight (approx) each, lb black
90° elbow: fig. 1156		**side outlet elbow: fig. 1109**	
⅛	.05	...	...
¼	.09	¼	.13
⅜	.14	⅜	.19
½	.21	½	.29
¾	.34	¾	.47
1	.55	1	.72
1¼	.86	1¼	1.08
1½	1.13	1½	1.50
2	1.76	2	2.30
tee: fig. 1157		**side outlet tee: fig. 1113**	
⅛	.08	...	...
¼	.13	...	...
⅜	.21	⅜	.23
½	.30	½	.34
¾	.47	¾	.55
1	.74	1	.86
1¼	1.12	1¼	1.28
1½	1.48	1½	1.70
2	2.28	2	2.60
waste nut: fig. 1133		**extension piece: fig. 1137**	
...	...	...	...
¼	.05	...	...
⅜	.08	⅜	.09
½	.10	½	.15
¾	.14	¾	.26
1	.18	1	.40
1¼	.40	...	...
1½	.53	...	...
2	.65	...	...

malleable iron | **300 lb, extra heavy**

pressure ratings, psi { steam at 550° F: 300; liquid & gas at 150° F: ¼ to 1 inch: 2000; 1¼ to 2 inch: 1500; 2½ to 4 inch: 1000; 5 and 6 inch: 800 }

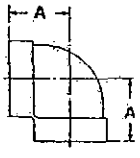
Grinnell 300 lb. extra heavy fittings conform to American National Standards: dimensions, ANSI B16.3; threads, ANSI B2.1; material, ASTM A-47 Grade 32510; hot dipped galvanizing, ASTM A-153.

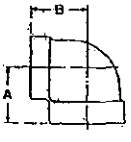
Grinnell extra heavy banded pattern fittings in this catalog, sizes ¼ to 6 inch, are included in the "List of Inspected Fire Protection Equipment and Materials" issued by Underwriters' Laboratories.

elbows

90° elbow
straight: fig. 1161
reducing: fig. 1161R

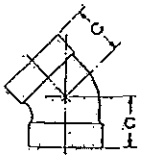
size, in.	A in.	weight (approx) each, lb black	weight (approx) each, lb galv.	size, in.	A in.	weight (approx) each, lb black	weight (approx) each, lb galv.
¼	15/16	.20	.21	2	2½	3.84	4.00
⅜	1 1/16	.29	.30	2½	2 15/16	6.13	6.28
½	1¼	.46	.48	3	3⅜	9.35	9.46
¾	1 7/16	.73	.75	3½	3¾	20.39	20.50
1	1⅝	1.10	1.15	4	4½	17.38	17.73
1¼	1 15/16	1.83	1.87	5	. . .	38.61	40.22
1½	2⅛	2.49	2.57	6	6¼	41.19	42.19





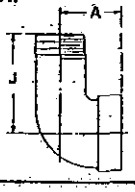
size, in.		A in.	B in.	weight (approx) each, lb black
⅜	¼	1	1	.26
½	⅜	1 3/16	1 3/16	.41
¾	½	1 3/16	1⅜	.65
	⅜	1¼	1 7/16	.55
1	¾	1½	1 5/16	1.00
	½	1 3/16	1½	.87
1¼	1	1¾	1 15/16	1.60
	¾	1⅞	1¾	1.44
1½	1¼	2	2 1/16	2.28
	1	1 15/16	2	1.92
2	1½	2¼	2⅜	3.34
	1¼	2⅛	2 1/16	3.12
2½	2	2 15/16	2¾	5.65
3	2½	3 5/16	3 5/16	8.53

45° elbow: fig. 1162



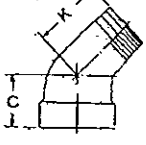
size, in.	C in.	weight (approx) each, lb black	weight (approx) each, lb galv.	size, in.	C in.	weight (approx) each, lb black	weight (approx) each, lb galv.
¼	15/16	.19	.20	2	2	3.60	3.70
⅜	⅞	.28	.29	2½	2¼	5.51	5.59
½	1	.43	.44	3	2½	8.41	8.54
¾	1⅛	.67	.69	3½	. . .	. . . .	. . . .
1	1⅜	1.05	1.07	4	2 15/16	13.61	13.85
1¼	1½	1.64	1.68	5	. . .	. . . .	. . . .
1½	1 15/16	2.26	2.30	6	3½	29.50	30.88

90° street elbow▲
fig. 1170



size, in.	A in.	J in.	weight (approx) each, lb black	weight (approx) each, lb galv.	size, in.	A in.	J in.	weight (approx) each, lb black	weight (approx) each, lb galv.
¼	15/16	1 5/16	.17	.18	1¼	1 15/16	2¼	1.69	1.72
⅜	1 1/16	1⅜	.28	.27	1½	2⅛	3⅛	2.32	2.40
½	1¼	2	.42	.44	2	2½	3 15/16	3.65	3.75
¾	1 7/16	2 5/16	.69	.71	2½	2 15/16	4½	6.03	6.21
1	1⅝	2⅝	1.08	1.10	3	3⅜	5⅛	9.56	9.86

45° street elbow
fig. 1160



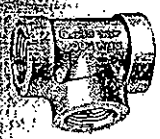
size, in.	C in.	K in.	weight (approx) each, lb black	size, in.	C in.	K in.	weight (approx) each, lb black
½	1	1⅜	.41	1¼	1½	2⅛	1.54
¾	1⅛	1 5/16	.60	1½	1 15/16	2 5/16	2.06
1	1⅜	1 13/16	.91	2	2	2 15/16	3.43

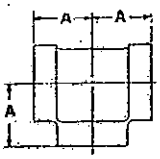
▲ Gas or liquid rating for street elbows only: 500 psi at 150°F.

tees

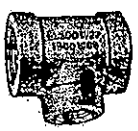
malleable iron, extra heavy

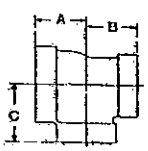
straight tee
fig. 1164





reducing tee
fig. 1164R





size, in.	center to end A, in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.	size, in.	center to end A, in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.
¼	15/16	.29	.30	2	2½	5.22	5.35
⅜	1 1/16	.42	.43	2½	2 15/16	8.51	8.66
½	1¼	.69	.70	3	3⅜	13.03	13.19
¾	1 3/16	1.07	1.08	3½	3¾	25.63	26.20
1	1⅝	1.59	1.62	4	4½	23.84	24.05
1¼	1 15/16	2.53	2.59	5	...	47.44	49.34
1½	2⅛	3.36	3.46	6	6¼	60.13	61.44

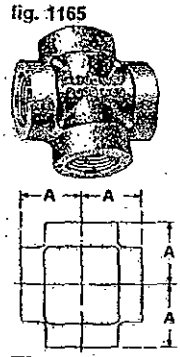
size, in.			center to end A, in.	center to end B, in.	center to end C, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
⅜	⅜	¼	1	1	1	.37	...
½	½	⅜	1 3/16	1 3/16	1 3/16	.61	.63
		¼	1 1/16	1 1/16	1⅛	.52	.54
	¾	½	1¼	1 3/16	1⅛	.58	...
¾	¾	½	1 3/16	1 3/16	1¾	.93	.96
		⅜	1¼	1¼	1 5/16	.83	.85
		¼	1 3/16	1 3/16	1¼	.76	.80
	½	¾	1 3/16	1 3/16	1¼	.93	...
		½	1 3/16	1¼	1⅜	.80	...
½		¾	1 3/16	1 3/16	1¼	.80	.84
1	1	¾	1½	1½	1 5/16	1.41	1.45
		½	1 3/16	1 3/16	1½	1.29	1.33
		⅜	1 3/16	1 3/16	1 3/16	1.18	...
		¼	1¼	1¼	1⅜	1.11	...
	¾	1	1 3/16	1 1/16	1⅜	1.44	...
		¾	1½	1 3/16	1 3/16	1.28	...
	½	1	1 3/16	1½	1⅜	1.36	...
¾	¾	1	1 5/16	1 5/16	1½	1.29	...
1¼	1¼	1	1¾	1¾	1 15/16	2.20	2.24
		¾	1 5/8	1 5/8	1¾	2.00	2.04
		½	1½	1½	1 11/16	1.82	1.88
		⅜	1 1/16	1 1/16	1⅝	1.74	...
	1	1¼	1 15/16	1 15/16	1 15/16	2.30	...
		1	1¾	1⅝	1 15/16	1.96	...
	¾	1¼	1 15/16	1¾	1 15/16	2.20	...
1½	1½	1¼	2	2	2 1/16	3.05	3.12
		1	1 15/16	1 15/16	2	2.78	2.83
		¾	1 11/16	1 11/16	1¾	2.48	2.54
		½	1⅝	1⅝	1 15/16	2.34	2.42
	1¼	1½	2 1/16	2 1/16	2⅛	3.14	...
2	2	1½	2¼	2¼	2⅜	4.74	4.80
		1¼	2⅛	2⅛	2 1/16	4.30	4.40
		1	2	2	2¼	4.05	4.20
		¾	1 15/16	1 15/16	2⅛	3.72	3.80
		½	1¾	1¾	2 1/16	3.50	3.54
	1½	2	2½	2⅜	2½	4.80	...
2½	2½	2	2 15/16	2 15/16	2⅝	7.60	7.80
		1½	2⅜	2⅜	2⅝	6.70	6.90
	2	2½	2 15/16	2¾	2 15/16	7.55	...
3	3	2½	3 1/16	3 1/16	3 1/16	11.60	11.75
		2	2 15/16	2 15/16	3⅛	10.25	10.40
		1½	2⅜	2⅜	3 1/16	9.50	9.60
	2½	3	3⅜	3⅜	3⅜	11.80	...
4	4	3	4	4	4⅜	20.00	20.50
		2½	3 11/16	3 11/16	4⅜	18.38	18.66
		2	3¾	3¾	4⅛	16.94	17.01

malleable iron — **300 lb, extra heavy**

pressure ratings, psi — steam at 550° F: 300; liquid & gas at 150° F: ¼ to 1 inch: 2000; 1¼ to 2 inch: 1500; 2½ to 4 inch: 1000; 5 and 6 inch: 800

cross

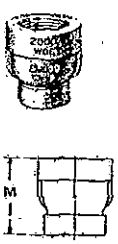
fig. 1165



size, in.	center to end A, in.	weight (approx) each, lb. black	galv.	size, in.	center to end A, in.	weight (approx) each, lb. black	galv.
¼	15/16	.35	.36	1½	2⅛	4.20	4.35
⅜	1 1/16	.51	.53	2	2½	6.40	6.60
½	1¼	.83	.86	2½	2 15/16	10.25	10.60
¾	1 7/16	1.29	1.32	3	3⅜	15.70	16.25
1	1⅝	1.96	2.02	3½	...	31.31	32.37
1¼	1¾	3.20	3.28	4	4½	28.15	28.50

reducer

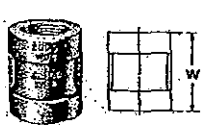
fig. 1167



size, in.		end to end M, in.	weight (approx) each, lb. black	galv.	size, in.		end to end	weight (approx) each, lb. black	galv.
⅜	¼	1 7/16	.21	.22	1½	¾	2 11/16	1.58	1.60
	⅜	1 11/16	.34	.36		½	2 11/16	1.51	1.54
½	¼	1 11/16	.32	.33		1½	3 3/16	2.80	2.88
	½	1¾	.50	.52		1¼	3 3/16	2.67	2.72
¾	⅜	1¾	.47	.48	2	1	3 3/16	2.56	2.58
	¼	1¾	.48	.49		¾	3 3/16	2.44	2.50
	¾	2	.79	.82		½	3 3/16	2.38	2.42
1	½	2	.72	.75	2½	2	3 11/16	4.44	4.54
	⅜	2	.71	.73		1½	3 11/16	4.15	4.30
	¼	2	.67	.68		2½	4 3/16	6.45	6.60
1¼	1	2 5/16	1.30	1.35	3	2	4 3/16	6.00	6.10
	¾	2 5/16	1.20	1.22		1½	4 3/16	5.75	5.87
	½	2 5/16	1.12	1.14		3	4 3/16	10.50	10.70
1½	1¼	2 11/16	1.81	1.86	4	2½	4 3/16	9.70	9.85
	1	2 11/16	1.66	1.69		2	4 3/16	9.50	9.60

coupling

fig. 1166



size, in.	end to end W, in.	weight (approx) each, lb. black	galv.	size, in.	end to end W, in.	weight (approx) each, lb. black	galv.
¼	1⅜	.17	.18	1¼	2⅞	1.63	1.67
⅜	1⅝	.26	.27	1½	2⅞	2.06	2.10
½	1⅜	.42	.43	2	3⅜	3.54	3.60
¾	2¼	.66	.68	2½	4⅛	5.45	5.65
1	2⅝	1.01	1.03	3	4⅛	7.75	8.00

cap

fig. 1163

size, in.	height L, in.	weight (approx) each, lb. black	galv.	size, in.	height L, in.	weight (approx) each, lb. black	galv.
¼	5/8	.10	.11	1¼	1⅞	.93	.95
⅜	5/8	.14	.15	1½	1⅞	1.21	1.24
½	1	.23	.24	2	1 11/16	1.93	1.96
¾	1⅛	.34	.36	2½	2¼	3.32	3.35
1	1¼	.56	.57	3	2¾	4.64	4.80

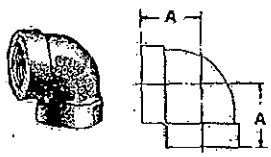
A.A.R. malleable iron — 300 lb

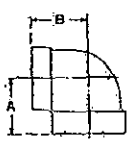
Grinnell A.A.R. fittings conform to the specifications of the Association of American Railroads AAR M-404. They also conform to American National Standards: dimensions, ANSI B16.3; threads ANSI B2.1; material, ASTM A-47 Grade 32510. Pressure ratings are the same as for extra heavy, opposite page.

elbows

90° elbow

straight: fig. 1161
reducing: fig. 1161R

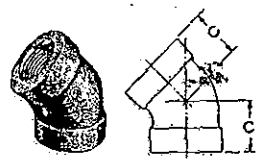




size, in.		center to end A, in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼		1⁹⁄₁₆	.20	.21
⅜		1¹¹⁄₁₆	.29	.30
½		1¼	.46	.48
¾		1⁷⁄₁₆	.73	.75
1		1⅝	1.10	1.15
1¼		1¹⁵⁄₁₆	1.83	1.87
1½		2⅛	2.49	2.57
2		2½	3.84	4.00
2½		2¹⁵⁄₁₆	6.13	6.28
3		3⅜	9.35	9.46

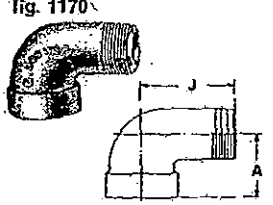
size, in.		A in.	B in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
½	⅜	1⁹⁄₁₆	1¹¹⁄₁₆	.41	.43
¾	½	1¾	1¾	.65	.67
1	¾	1½	1¹⁵⁄₁₆	1.00	1.02
1¼	1	1¾	1¹³⁄₁₆	1.60	1.62
1½	1¼	2	2⅛	2.28	2.32
2	1½	2¼	2⅜	3.34	3.44
2½	2	2¹⁵⁄₁₆	2¾	5.65	5.75
3	2½	3⅜	3⅝	8.53	8.82

45° elbow: fig. 1162



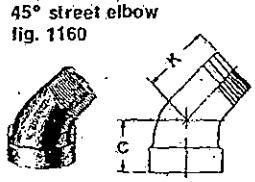
size, in.	center to end C, in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼	⁹⁄₁₆	.19	.20
⅜	⅝	.28	.29
½	1	.43	.44
¾	1¼	.67	.69
1	1⁵⁄₁₆	1.05	1.07
1¼	1½	1.64	1.68
1½	1¹³⁄₁₆	2.26	2.30
2	2	3.60	3.70
2½	2¼	5.51	5.59
3	2½	8.41	8.54

90° street elbow
fig. 1170



size, in.	A in.	J in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
½	1¼	2	.42	.44
¾	1⁵⁄₁₆	2⅛	.69	.71
1	1⅝	2⅜	1.08	1.10
1¼	1¹³⁄₁₆	2⅞	1.69	1.72
1½	2⅛	3⅛	2.32	2.40
2	2½	3¹³⁄₁₆	3.65	3.75
2½	2¹⁵⁄₁₆	4½	6.03	6.21
3	3⅜	5⅛	9.56	9.68

45° street elbow
fig. 1160



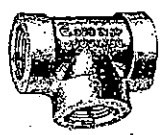
size, in.	C in.	K in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
½	1	1⅜	.41	.42
¾	1⅛	1⅝	.60	.63
1	1⅜	1¹⁵⁄₁₆	.91	.94
1¼	1½	2⅛	1.54	1.58
1½	1¹⁵⁄₁₆	2⅝	2.06	2.12
2	2	2¹³⁄₁₆	3.43	3.48

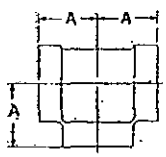
A.A.R. malleable iron 300 lb

pressure ratings, psi { steam at 550° F: 300; liquid & gas at 150° F: ¼ to 1 inch: 2000; 1¼ to 2 inch: 1500; 2½ & 3 inch: 1000

tees

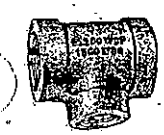
tee: fig. 1164

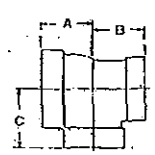




size, in.	center to end A, in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
¼	1⅛	.29	.30
⅜	1⅛	.42	.43
½	1¼	.69	.70
¾	1⅜	1.07	1.08
1	1⅜	1.59	1.62
1¼	1⅝	2.53	2.59
1½	2⅛	3.36	3.48
2	2½	5.22	5.35
2½	2⅝	8.51	8.66
3	3⅛	13.03	13.19

reducing tee
fig. 1164R

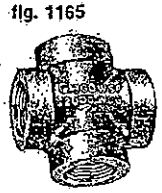


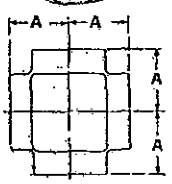


size, in.			A in.	B in.	C in.	weight (approx) each, lb black	weight (approx) each, lb galvanized
½	½	¾	1¾	1⅜	1⅜	.61	.63
	⅜	½	1¼	1⅜	1¼	.58	.60
¾	¾	½	1⅝	1⅝	1⅜	.93	.96
	½	¾	1⅜	1⅜	1⅜	.93	.95
1	1	¾	1½	1½	1⅝	1.41	1.45
		½	1⅜	1⅜	1½	1.29	1.33
		⅜	1⅜	1⅜	1⅜	1.18	1.22
	⅜	1	1⅜	1⅝	1⅝	1.44	1.46
1¼	1¼	1	1¾	1¾	1⅞	2.20	2.24
		¾	1⅝	1¾	1¾	2.00	2.04
		½	1½	1½	1⅞	1.82	1.88
	1	1¼	1⅝	1⅝	1⅝	2.30	2.40
1½	1½	1¼	2	2	2⅛	3.05	3.12
		1	1⅞	1⅞	2	2.78	2.83
		¾	1⅞	1⅞	1⅞	2.48	2.54
		½	1⅝	1⅝	1⅝	2.34	2.42
	1¼	1½	2⅛	2⅛	2⅛	3.14	3.24
2	2	1½	2¼	2¼	2⅜	4.74	4.80
		1¼	2⅛	2⅛	2⅛	4.30	4.40
		1	2	2	2¼	4.05	4.20
		¾	1⅞	1⅞	2⅛	3.72	3.80
		½	1¾	1¾	2⅛	3.50	3.54
	1½	2	2½	2⅜	2½	4.80	4.90
2½	2½	2	2⅞	2⅞	2¾	7.60	7.80
		1½	2⅝	2⅝	2⅝	6.70	6.90
	2	2½	2⅞	2¾	2⅞	7.55	7.75
3	3	2½	3⅛	3⅛	3⅛	11.60	11.75
		2	2⅞	2⅞	3⅛	10.25	10.40
	2½	3	3⅛	3⅛	3⅛	11.80	12.00

cross

fig. 1165

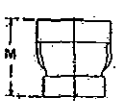




size, in.	center to end A, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
¼	13/16	.35	.36
⅜	1 1/16	.51	.53
½	1¼	.83	.86
¾	1 7/16	1.29	1.32
1	1 5/8	1.96	2.02
1¼	1 15/16	3.20	3.28
1½	2 1/16	4.20	4.35
2	2½	6.40	6.60
2½	2 13/16	10.25	10.60
3	3⅜	15.70	16.25

reducer

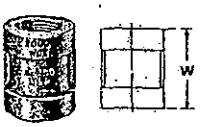
fig. 1167



size, in.		end to end M, in.	weight (approx) each, lb black	weight (approx) each, lb galv.	size, in.		end to end M, in.	weight (approx) each, lb black	weight (approx) each, lb galv.
⅜	¼	1 7/16	.21	.22	1½	¾	2 11/16	1.58	1.60
½	⅜	1 11/16	.34	.36		½		1.51	1.54
¾	½	1¾	.50	.52		1½		2.80	2.88
1	¾	2	.79	.82	2	1¼	3 3/16	2.67	2.72
	½		.72	.75		1		2.56	2.58
1¼	1	2 3/16	1.30	1.35		½		2.38	2.42
	¾		1.20	1.22	2½	2	3 11/16	4.44	4.54
	½		1.12	1.14		2½		6.45	6.60
1½	1¼	2 13/16	1.81	1.86	3	2	4 1/16	6.00	6.10
	1		1.66	1.69		1½		5.75	5.87

coupling

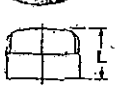
fig. 1166



size, in.	end to end W, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
¼	1⅜	.17	.18
⅜	1⅜	.26	.27
½	1⅜	.42	.43
¾	2⅛	.68	.68
1	2⅜	1.01	1.03
1¼	2⅜	1.63	1.67
1½	2⅜	2.06	2.10
2	3⅛	3.54	3.60
2½	4⅛	5.45	5.65
3	4⅛	7.75	8.00

cap

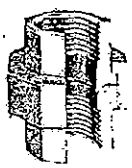
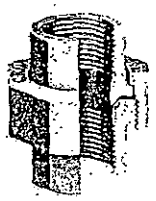
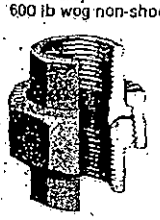
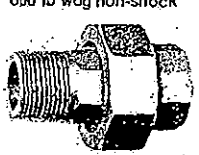
fig. 1163



size, in.	end to end L, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
¼	25/32	.10	.11
⅜	15/16	.14	.15
½	1	.23	.24
¾	1⅛	.34	.36
1	1¼	.56	.57
1¼	1¾	.93	.95
1½	1¾	1.21	1.24
2	1 11/16	1.93	1.96
2½	2⅛	3.32	3.35
3	2⅜	4.64	4.80

malleable iron unions — 150 lb, 250 lb, 300 lb

Grinnell malleable iron unions conform to American National Standards: threads, ANSI B2.1; material, ASTM A-47 Grade 32510; hot dipped galvanizing ASTM A-153; dimensions to Federal specifications WW-U-531a for 250 lb unions only.

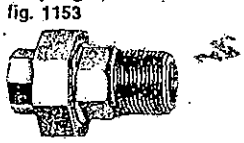
ground joint bronze-to-iron	size, in.	end to end, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
150 lb union fig. 463 150 lb wsp 300 lb wog non-shock 	⅛	1¼	.13	.14
	¼	1⅜	.17	.18
	⅜	1⅝	.26	.27
	½	1⅞	.38	.39
	¾	2⅛	.53	.55
	¾ x ½	2⅛	.55	.56
	1	2⅜	.79	.81
	1¼	2½	1.29	1.33
	1½	2⅝	1.55	1.58
	2	3	2.30	2.35
	2½	3⅜	3.50	3.54
	3	3¾	4.81	4.94
250 lb union fig. 554 250 lb wsp 500 lb wog non-shock 	⅛	1¼	.13	.14
	¼	1¾	.27	.28
	⅜	1⅞	.36	.38
	½	2⅛	.50	.52
	¾	2⅜	.84	.86
	1	2⅝	1.25	1.27
	1¼	2¾	1.62	1.65
	1½	3	2.05	2.09
	2	3⅜	3.48	3.52
	2½	3⅞	5.35	5.40
	3	4¼	7.45	7.60
	4	5	17.60	17.83
300 lb union fig. 459 300 lb wsp 600 lb wog non-shock 	⅛	1¼	.13	.14
	¼	1¾	.26	.29
	⅜	1⅞	.37	.39
	½	2⅛	.51	.52
	¾	2⅜	.82	.84
	1	2⅝	1.21	1.22
	1¼	2¾	1.59	1.61
	1½	3	2.04	2.10
	2	3⅜	3.42	3.55
	2½	3⅞	5.40	5.45
	3	4¼	7.49	7.60
	4	5	17.60	17.83
300 lb union male and female fig. 551 300 lb wsp 600 lb wog non-shock 	¼	2⅛	.30	.304
	⅜	2⅛	.42	.435
	½	3	.60	.62
	¾	3⅛	.92	.96
	1	3⅛	1.44	1.50
	1¼	3⅜	2.01	2.04
	1½	4⅛	2.63	2.73
	2	4⅛	4.33	4.40

ground joint bronze-to-iron

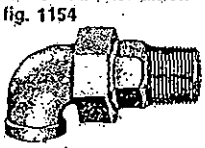
size, in.	center to end, in. elbow	center to end, in. union	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
300 lb 90° elbow female union fig. 552				
300 lb. wsp				
¼	1⅜	1 11/16	.34	.35
⅜	1 5/16	2 1/16	.51	.53
½	1¼	2 5/16	.76	.78
¾	1 7/16	2¾	1.22	1.25
1	1⅝	3	1.84	1.90
1¼	1 13/16	3 7/16	2.69	2.78
1½	2⅛	3¾	3.63	3.71
2	2½	4 7/16	5.83	5.88
300 lb 90° elbow male union fig. 553				
300 lb. wsp				
¼	1⅜	2½	.36	.38•
⅜	1 5/16	2 13/16	.58	.59•
½	1¼	3¼	.86	.89•
¾	1 7/16	3⅝	1.34	1.37•
1	1⅝	4⅛	2.09	2.17•
1¼	1 13/16	4⅝	3.14	3.24•
1½	2⅛	5	4.21	4.35•
2	2½	5⅝	6.70	6.76•

boiler fittings
150 lb. water at 200° F

coupling with union fig. 1153



90° elbow with union fig. 1154



female size, in.			coupling end to end, in.	center to end union	center to end elbow	weight (approx) each, lb. galvanized coupling	weight (approx) each, lb. galvanized elbow
¾	¾	1	3 3/16	3 13/16	1 5/16	1.01•	1.25•
¾	½	1	3 3/16	3 13/16	1 5/16	1.05•	1.30•
½	½	1	3 3/16	3 13/16	1¼	1.03•	1.19•

Boiler fittings are read as follows:
first, the female end;
second, the internal thread of the male end;
third, the external thread of the male end.

gasket type

union: fig. 470
150 lb. wsp
300 lb. cold water

size, in.	approx. end to end, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
¼	1⅝	.21	.22
⅜	1⅝	.31	.32
½	1⅞	.36	.36
¾	2⅛	.58	.59
1	2⅛	.67	.69
1¼	2½	1.07	1.08
1½	2 11/16	1.38	1.40
2	2⅞	2.15	2.21
2½	3⅜	•	•
3	3⅞	•	•

• Not stocked

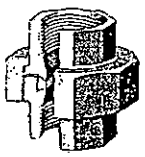
A.A.R. malleable iron unions — 300 lb

pressure ratings, psi { steam at 550° F: 300; non-shock cold water, oil, gas or gasoline: 600

A.A.R. unions and union fittings have a bronze-to-iron ground joint seat. They may be taken apart and reassembled repeatedly without affecting their strength and tightness. The bronze seat ring is forced in place under high pressure and will not loosen in service. No gasket is needed.

ground joint bronze-to-iron

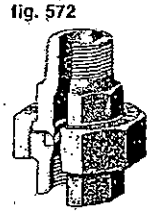
union fig. 571+



+ Also available with all iron seat, black only.

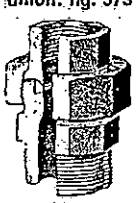
size, in.	end to end, in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galvanized	size, in.	end to end, in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galvanized
¼	1 5/16	.31	.32	1¼	2 13/16	2.21	2.28
⅜	1 13/16	.44	.45	1½	3	2.89	2.90
½	1 13/16	.60	.62	2	3 3/16	4.43	4.45
¾	2¼	1.05	1.08	2½	4	7.35	7.53
1	2 7/16	1.56	1.56	3	4 5/16	10.89	10.94

union male and female fig. 572



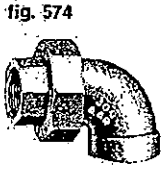
size, in.	end to end, in.	wgt (approx) each, lb.	size, in.	end to end, in.	wgt (approx) each, lb.
¼	2¼	.34 •	1¼	3¼	2.69 •
⅜	2½	.50 •	1½	3 13/16	3.34 •
½	2 11/16	.70 •	2	4 3/16	5.28 •
¾	3 1/16	1.25 •	2½	5 1/16	8.72 •
1	3 5/8	1.72 •	3	5½	11.75 •

reducing air pump union: fig. 573



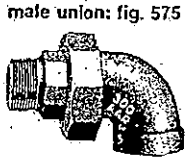
size, in. male end	size, in. female end	end to end, in.	wgt (approx) each, lb.	size, in. male end	size, in. female end	end to end, in.	wgt (approx) each, lb.
1¼	1	3½	1.94•	2	1¼	4	3.75•
1½	1¼	3 15/16	2.75•	2	1	3¾	3.81•
2	1½	4⅛	3.56•				

90° elbow female union fig. 574



size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black	wgt (approx) each, lb galvanized	size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black	wgt (approx) each, lb galvanized
¼	2	1 5/16	.43	.44	1¼	3 11/16	1 15/16	3.37	3.49
⅜	2¼	1 1/16	.61	.63	1½	3 13/16	2⅛	4.45	4.46
½	2 3/16	1¼	.88	.92	2	4½	2½	6.95	7.12
¾	2⅝	1 3/16	1.48	1.53	2½	5 3/16	2 5/16	12.03	12.34
1	3 1/16	1⅝	2.22	2.25	3	5 13/16	3⅜	17.99	18.31

90° elbow male union: fig. 575



size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black	size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black
¼	2 5/16	5/16	.53	1¼	4⅛	1 13/16	4.22
⅜	2 13/16	1 1/16	.80	1½	4⅛	2⅛	5.22
½	3¼	1¼	1.09	2	5⅛	2½	8.16
¾	3¼	1 3/16	1.84	2½	6⅞	2 15/16	13.59
1	4 1/16	1⅝	2.50	3	7½	3⅜	19.97

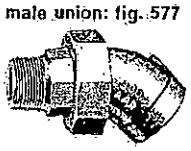
• Not stocked

ground joint bronze-to-iron

45° elbow female union: fig. 576

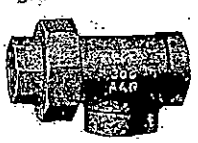
size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black
¼	1⅛	1⅜₁₆	.47
⅜	1¼	1⅜₁₆	.63
½	1⅜₁₆	1¼	.88
¾	2⅛	1⅜₁₆	1.47
1	2½	1⅝	2.13

45° elbow male union: fig. 577



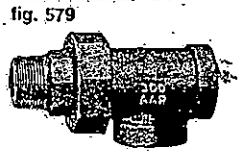
size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black
¼	2⅛	1⅜₁₆	.50
⅜	2⅛	1⅜₁₆	.72
½	2⅜₁₆	1¼	.97
¾	3⅛	1⅜₁₆	1.66
1	3⅜	1⅝	2.41

tee female union on run fig. 578



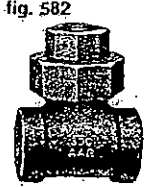
size, in.	center to end, in. union	center to end, in. tee run	wgt (approx) each, lb
¼	2	1⅜₁₆	.56
⅜	2¼	1⅜₁₆	.78
½	2⅜₁₆	1¼	1.16
¾	2⅞	1⅜₁₆	1.94
1	3⅜₁₆	1⅝	2.75

tee male union on run fig. 579



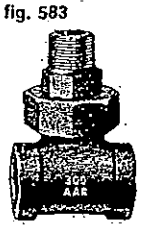
size, in.	center to end, in. union	center to end, in. tee run	wgt (approx) each, lb
¼	2⅜₁₆	1⅜₁₆	.63
⅜	2⅝₁₆	1⅜₁₆	.88
½	3⅛	1¼	1.25
¾	3¾	1⅜₁₆	2.09
1	4⅛₁₆	1⅝	3.00

tee female union on outlet fig. 582



size, in.	center to end, in. union	center to end, in. tee run	wgt (approx) each, lb
¼	2	1⅜₁₆	.56
⅜	2¼	1⅜₁₆	.64
½	2⅜₁₆	1¼	1.19
¾	2⅞	1⅜₁₆	1.97
1	3⅜₁₆	1⅝	2.78

tee male union on outlet fig. 583



size, in.	center to end, in. union	center to end, in. tee run	wgt (approx) each, lb
¼	2⅜₁₆	1⅜₁₆	.63
⅜	2⅝₁₆	1⅜₁₆	.91
½	3⅛	1¼	1.31
¾	3¾	1⅜₁₆	2.13
1	4⅛₁₆	1⅝	3.06

size, in.	center to end, in. union	center to end, in. elbow	wgt (approx) each, lb black
1¼	2⅞	1⅝₁₆	3.25
1½	3⅛	2⅛	4.22
2	3⅞₁₆	2½	6.69
2½	4⅛	2⅝₁₆	11.00
3	4¾	3⅜	17.16
1¼	3⅞₁₆	1⅝₁₆	3.75
1½	4⅛	2⅛	4.72
2	4⅝	2½	7.47
2½	5⅛	2⅝₁₆	12.25 •
3	6⅛	3⅜	18.25 •

size, in.	center to end, in. union	center to end, in. tee run	wgt (approx) each, lb
1¼	3⅞₁₆	1⅝₁₆	4.63
1½	3⅞₁₆	2⅛	5.63
2	4½	2½	8.84
2½	5⅛	2⅝₁₆	14.59
3	5⅞₁₆	3⅜	23.00
1¼	4⅛	1⅝₁₆	5.09
1½	4⅞	2⅛	6.25
2	5⅜	2½	9.66
2½	6⅞	2⅝₁₆	15.66
3	7½	3⅜	24.16 •
1¼	3⅞₁₆	1⅝₁₆	4.59
1½	3⅞₁₆	2⅛	5.78
2	4½	2½	8.88
2½	5⅛	2⅝₁₆	15.00 •
3	5⅞₁₆	3⅜	24.25 •
1¼	4⅛	1⅝₁₆	5.00
1½	4⅞	2⅛	6.28
2	5⅜	2½	9.72
2½	6⅞	2⅝₁₆	16.25 •
3	7½	3⅜	25.41 •

• Not stocked

cast iron threaded | 125 lb, standard

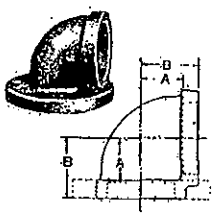
pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

Grinnell standard and extra heavy cast iron threaded fittings are manufactured in accordance with American National Standards: dimensions, ANSI B16.4 (except plugs and bushings, ANSI B16.14); threads, ANSI B2.1; material, ASTM-A 126, Class A; hot dipped galvanizing, ASTM-A 153; dimensions also to Federal specification, WW-P-501d (except plugs and bushings, WW-P-471a).
Grinnell standard and extra heavy fittings in this section, sizes ¼ to 8-inch, are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

elbows

90° elbow
straight: **fig. 351**
right and left
fig. 353
pitched: **fig. 354⊙**

flanged and threaded
fig. 371[4]



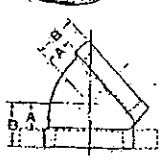
A: center to end of pipe
B: center to face of fitting

size, in.	A in.	B in.	weight (approx) each, lb: figs. 351, 353, 354 black	fig. 351 galv.	fig. 371 black
¼	½	13/16	.16	.17	....
⅜	5/8	15/16	.25	.26	....
½	11/16	1⅛	.40	.41	....
¾	13/16	1 5/16	.69	....	....
1	15/16	1½	.92	....	....
1¼	1⅛	1¾	1.44	....	....
1½	1 5/16	1 15/16	1.95	....	....
2	1⅝	2¼	3.13	....	....
2½	1 15/16	2 11/16	4.94	5.13	10.22
3	2⅜	3⅛	7.21	7.40	13.25
3½	2⅝	3 7/16	9.67	10.10	18.22
4	2 11/16	3¾	12.17	12.67	21.56
5	3⅜	4½	21.46	22.32	28.13
6	3⅞	5⅛	31.33	33.33	40.50
8	5⅜	6¾	64.56	67.14	80.06

Fig. 353 has ribs cast on band which denotes the left hand thread.
[4] Sizes 4 inch and larger have two bolt holes tapped for stud or tap bolts.
⊙ Available in sizes ½ inch through 2 inch only, tapped to pitch ¼ inch in 1 foot; cast with letter "P" on body.

45° elbow: fig. 356

flanged and threaded
fig. 372

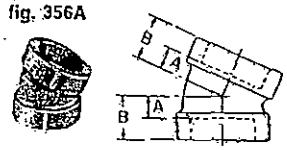


A: center to end of pipe
B: center to face of fitting

size, in.	A in.	B in.	weight (approx) each, lb: fig. 356 black	fig. 356 galv.	fig. 372 black
¼	3/8	¾	.16	.17	....
⅜	7/16	15/16	.23	.25	....
½	9/16	⅞	.37	.38	....
¾	½	1	.55	.56	....
1	5/8	1⅛	.83	.88	....
1¼	¾	1¼	1.33	1.36	....
1½	15/16	1⅜	1.79	1.83	....
2	1	1 11/16	2.89	2.96	....
2½	1¼	1 15/16	4.29	4.35	....
3	1⅜	2⅜	6.44	6.65	....
3½	1⅝	2⅝	8.42	8.71	....
4	1⅞	2⅞	10.64	11.22	19.88
5	2⅜	3⅜	16.96	17.38	....
6	2⅞	3⅞	26.02	26.19	35.31
8	3¾	4¼	50.17	52.00	64.41

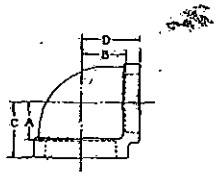
elbows, *cont'd*

22½° elbow
fig. 356A



size, in.	A in.	B in.	weight (approx) each, lb. black	galvanized
¾	⅜	⅞	.52	•
1	⅜	1	.80	•
1¼	½	1⅛	1.40	•
1½	⅝	1¼	1.64	•
2	¾	1⅜	2.50	•
2½	¾	1⅝	3.95	•

90° elbow
reducing: fig. 352



size, in.		A in.	B in.	C in.	D in.	weight (approx) each, lb. black
½	⅜	⅝	1⅛	1⅛	1⅛	.34
	¼	....	....	....	....	.40
¾	½	⅝	1⅜	1⅜	1¼	.51
1	¾	¾	1⅝	1⅜	1⅜	.76
	½	⅞	1⅝	1¼	1⅜	.67
1¼	1	1⅛	1⅞	1⅝	1⅞	1.21
	¾	1⅛	1⅞	1⅝	1⅝	1.02
	½	1⅛	1⅞	1⅝	1⅝	1.07
1½	1¼	1⅜	1¼	1⅞	1⅞	1.74
	1	1	1¼	1⅝	1⅞	1.44
	¾	1	1⅜	1⅝	1⅞	1.55
	½	1	1¼	1⅜	1⅞	1.53
2	1½	1⅜	1½	2	2⅛	2.59
	1¼	1⅜	1⅜	1⅞	2⅛	2.33
	1	1⅜	1⅜	1¾	2	2.08
	¾	1⅜	1½	1¾	2	2.20
	½	1⅜	1⅜	1¾	2	2.22
2½	2	1⅝	1⅞	2⅛	2⅛	4.01
	1½	1⅝	1⅞	2⅛	2⅛	3.68
	1¼	1⅝	1¾	2⅛	2⅛	3.41
	1	1	1¾	1⅞	2⅛	2.93
3	2½	1⅞	2⅛	2⅜	3⅛	6.44
	2	1⅞	2¼	2⅜	2⅜	5.35
	1½	1⅞	2⅛	2⅛	2⅜	5.65
	1¼	1⅞	2⅛	2⅛	2⅜	5.98
3½	3	2⅛	2⅜	3⅛	3⅛	8.95
4	3½	2⅛	2⅜	3½	3⅜	11.89
	3	2⅛	2⅜	3¼	3⅜	10.63
	2½	2⅛	2¼	3¼	3⅜	11.27
	2	2⅛	2⅜	3¼	3⅜	11.89
5	4	2⅜	3⅛	4	4⅛	16.47
	3	2⅜	3⅛	4	4⅛	19.00
	2½	2⅜	3½	4	4⅛	19.88
6	5	3⅛	3⅜	4⅛	5	26.66
	4	2⅜	3¼	4⅛	4⅜	23.53
	3	2⅜	3⅜	3⅜	4⅜	19.43
8	6	4⅛	5⅛	5⅛	6⅛	51.11

A, B:
center to end of pipe

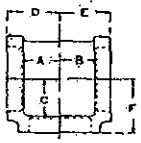
C, D:
center to face of fitting

• Not stocked

cast iron threaded | **125 lb, standard** | pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

tees

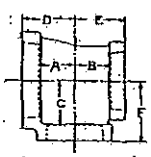
straight tee
fig. 358



A, B, C: center to end of pipe
D, E, F: center to face of fitting

size, in.	A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
¼	½	½	½	9/16	11/16	9/16	.22	.23
⅜	5/8	5/8	⅝	1	1	1	.35	.36
½	11/16	11/16	11/16	1⅛	1⅛	1⅛	.56	.58
¾	13/16	13/16	13/16	1 5/16	1 5/16	1 5/16	.84	.85
1	1 5/16	1 5/16	1 5/16	1½	1½	1½	1.25	1.31
1¼	1⅝	1⅝	1⅝	1¾	1¾	1¾	2.03	2.07
1½	1 15/16	1 15/16	1 15/16	1 15/16	1 15/16	1 15/16	2.70	2.72
2	1 15/16	1 15/16	1 15/16	2¼	2¼	2¼	4.23	4.33
2½	1 13/16	1 13/16	1 13/16	2 5/16	2 5/16	2 5/16	6.67	6.79
3	2 3/16	2 3/16	2 3/16	3⅛	3⅛	3⅛	10.00	10.16
3½	2 7/16	2 7/16	2 7/16	3 5/16	3 5/16	3 5/16	13.29	13.82
4	2 11/16	2 11/16	2 11/16	3¾	3¾	3¾	16.33	16.99
5	3 3/16	3 3/16	3 3/16	4½	4½	4½	27.33	27.67
6	3 7/16	3 7/16	3 7/16	5 5/16	5 5/16	5 5/16	40.85	41.40
8	5 3/16	5 3/16	5 3/16	6 5/16	6 5/16	6 5/16	79.00	81.25

reducing tee
fig. 359



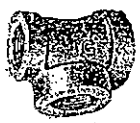
A, B, C:
center to end of pipe.

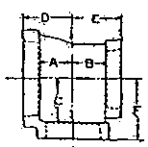
D, E, F:
center to face of fitting

			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
½	¼	⅜	11/16	11/16	¾	1⅛	1⅛	1⅛	.57	....
	⅜	¼	11/16	11/16	11/16	1⅛	1⅛	1⅛	.57	....
	¼	½	11/16	⅝	⅝	1¼	1	1⅛	.59	....
¾	½	¾	13/16	13/16	13/16	1⅜	1⅜	1¼	.76	....
	¾	½	13/16	13/16	13/16	1⅜	1⅜	1¼	.75	....
	¼	⅜	⅞	⅞	⅞	1⅜	1⅜	1⅜	.62	....
	½	¾	13/16	13/16	13/16	1⅜	1¼	1⅜	.75	....
	⅜	½	13/16	13/16	13/16	1⅜	1¼	1¼	.64	....
	¼	¾	13/16	¾	13/16	1⅜	1¼	1⅜	.79	....
½	½	¾	13/16	13/16	11/16	1¼	1¼	1⅜	.68	....
1	¾	1	1 1/16	1 1/16	1 1/16	1¾	1⅜	1⅜	1.11	....
	½		1 1/16	1 1/16	1 1/16	1¼	1¼	1⅜	1.01	1.03
	¼		1 1/16	1 1/16	1⅛	1¼	1¼	1⅜	1.01	....
	1	¾	1 5/16	1 5/16	1 5/16	1½	1⅜	1½	1.13	....
	¾	¾	1 5/16	1 5/16	1 5/16	1¾	1⅜	1⅜	1.00	....
		½	1 5/16	1 5/16	1 5/16	1¼	1⅜	1¾	.89	....
	½	1	1 5/16	1 5/16	1 5/16	1½	1⅜	1½	1.08	....
		¾	1 5/16	1 5/16	1 5/16	1⅜	1¼	1⅜	.91	....
		½	1 5/16	¾	1 5/16	1¼	1¼	1⅜	.90	....
	¼	1	1 5/16	1 5/16	1 5/16	1½	1¼	1½	1.08	....
¾	¾	1	1 5/16	1 5/16	1 5/16	1⅛	1⅛	1⅜	.99	....
½	½		1	1	1 5/16	1⅛	1⅛	1⅜	1.00	....
1¼	1¼	1	1 5/16	1 5/16	1⅛	1⅛	1⅛	1 13/16	1.73	....
		¾	1 5/16	1 5/16	1⅛	1⅛	1⅛	1⅜	1.57	....
		½	1 5/16	1 5/16	1⅛	1⅛	1⅛	1⅛	1.47	....
	1	1¼	1⅛	1⅛	1⅛	1¼	1 13/16	1¾	1.79	....
		1	1 5/16	1 5/16	1⅛	1⅛	1⅛	1 13/16	1.53	1.56
		¾	1 5/16	1 5/16	1⅛	1⅛	1⅜	1⅜	1.36	....
		½	1 5/16	1 5/16	1⅛	1⅛	1¼	1⅛	1.27	1.30
	¾	1¼	1⅛	1⅛	1⅛	1¼	1⅜	1¼	1.73	....
		1	1 5/16	1 5/16	1⅛	1⅛	1⅛	1 1/16	1.43	....
		¾	1 5/16	1 5/16	1⅛	1⅛	1¼	1⅜	1.27	....
	½	1¼	1⅛	1⅛	1⅛	1¼	1⅛	1¼	1.64	....
		1	1 5/16	1 5/16	1⅛	1⅛	1⅜	1 1/16	1.38	....
1	1	1¼	1⅛	1¼	1 5/16	1 13/16	1 13/16	1⅛	1.49	....

tees, *cont'd*

reducing tee
fig. 359





A, B, C:
center to end of pipe

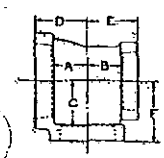
D, E, F:
center to face of fitting

size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
1½	1½	1¼	1 3/16	1 3/16	1 1/4	1 5/16	1 5/16	1 1/4	2.44	....
		1	1	1	1 1/4	1 5/16	1 5/16	1 5/16	2.13	2.17
		¾	1 1/16	1 1/16	1 1/4	1 1/2	1 1/2	1 3/4	1.95	....
		½	1 3/16	1 3/16	1 1/4	1 7/16	1 7/16	1 11/16	1.84	1.87
	1¼	1½	1 3/16	1 1/4	1 3/16	1 5/16	1 3/16	1 5/16	2.50	....
		1¼	1 3/16	1 1/16	1 1/4	1 5/16	1 3/4	1 7/16	2.28	....
		1	1	1 5/16	1 1/4	1 3/8	1 3/16	1 5/16	1.97	2.05
		¾	1 1/16	1 5/16	1 1/4	1 1/2	1 7/16	1 3/4	1.79	....
		½	1 3/16	1 1/16	1 1/4	1 7/16	1 3/16	1 11/16	1.67	1.73
	1	1½	1 3/16	1 1/4	1 3/16	1 5/16	1 13/16	1 13/16	2.29	....
		1¼	1 3/16	1 1/16	1 1/4	1 13/16	1 13/16	1 7/16	2.08	....
		1	1	1 5/16	1 1/4	1 5/16	1 1/2	1 13/16	1.72	....
		¾	1 1/16	1 5/16	1 1/4	1 1/2	1 7/16	1 3/4	1.70	....
		½	1 3/16	1 3/16	1 1/4	1 7/16	1 3/16	1 11/16	1.75	....
	¾	1½	1 3/16	1 1/4	1 3/16	1 13/16	1 3/4	1 13/16	2.18	....
	½	1½	1 3/16	1 1/4	1 3/16	1 13/16	1 13/16	1 13/16	2.14	....
		1¼	1 3/16	1 1/16	1 1/4	1 13/16	1 3/16	1 7/16	1.93	....
1¼	1¼	1½	1 1/2	1 1/4	1 3/16	1 7/16	1 7/16	1 13/16	2.29	....
1¼	1		1 1/2	1 1/4	1 3/16	1 7/16	1 13/16	1 13/16	2.07	....
1	1		1 1/4	1 1/4	1	1 13/16	1 13/16	1 5/16	1.84	....
2	2	1½	1 3/16	1 3/16	1 1/2	2	2	2 1/16	3.59	3.74
		1¼	1 3/16	1 3/16	1 3/16	1 7/16	1 7/16	2 3/16	3.38	....
		1	1 3/16	1 3/16	1 3/16	1 3/4	1 3/4	2	3.05	3.14
		¾	1 1/16	1 1/16	1 3/16	1 7/16	1 7/16	1 13/16	2.86	....
		½	1 3/16	1 3/16	1 3/16	1 1/2	1 1/2	1 7/16	2.74	2.81
	1½	2	1 3/16	1 1/2	1 3/16	2 1/4	2 1/16	2 1/4	3.70	....
		1½	1 3/16	1 3/16	1 1/2	2	1 13/16	2 1/16	3.24	3.38
		1¼	1 3/16	1 3/16	1 3/16	1 7/16	1 13/16	2 3/16	2.98	....
		1	1 3/16	1	1 3/16	1 3/4	1 3/4	2	2.66	....
		¾	1 1/16	1 1/16	1 3/16	1 7/16	1 1/2	1 13/16	2.46	....
		½	1 3/16	1 3/16	1 3/16	1 1/2	1 7/16	1 7/16	2.34	2.38
2	2	2	1 3/16	1 3/16	1 3/16	2 1/4	2 1/16	2 1/4	3.71	....
		1½	1 3/16	1 1/2	1 1/2	2	1 7/16	2 1/16	3.13	....
		1¼	1 3/16	1 1/16	1 3/16	1 7/16	1 3/4	2 3/16	2.90	....
		1	1 3/16	1	1 3/16	1 3/4	1 3/16	2	2.73	....
		¾	1 1/16	1 1/16	1 3/16	1 7/16	1 1/2	1 13/16	2.50	....
	1¼	2	1 3/16	1 3/16	1 3/16	2 1/4	2	2 1/4	3.46	....
		1½	1 3/16	1 1/4	1 1/2	2	1 13/16	2 1/16	2.85	....
		1¼	1 3/16	1 1/16	1 1/2	1 7/16	1 3/4	2 3/16	2.94	....
		1	1 3/16	1 1/16	1 3/16	1 3/4	1 3/16	2	2.70	....
	1	2	1 3/16	1 3/16	1 3/16	2 1/4	1 13/16	2 1/4	3.31	....
		1½	1 3/16	1 3/16	1 1/2	2	1 13/16	2 1/16	3.40	....
	¾	2	1 3/16	1 3/16	1 3/16	2 1/4	1 7/16	2 1/4	3.30	....
	½	1½	1 3/16	1 3/16	1 1/2	2	1 13/16	2 1/16	2.95	....
1½	1½		1 1/2	1 1/2	1 3/16	2 1/16	2 1/16	2	3.23	....
1½	1¼		1 1/2	1 3/16	1 3/16	2 1/16	2 3/16	2	3.07	....
1¼	1	2	1 1/2	1 3/16	1 3/16	2 1/16	2	2	2.91	....
1¼	1¼		1 3/16	1 3/16	1 3/16	2 1/16	2 1/16	1 7/16	2.81	....
1¼	1		1 3/16	1 3/16	1 3/16	2 1/16	2	1 7/16	2.66	....
2½	2	2	1 3/16	1 3/16	1 7/16	2 5/16	2 5/16	2 5/16	5.88	6.02
		1½	1 3/16	1 3/16	1 3/16	2 5/16	2 5/16	2 5/16	5.14	....
		1¼	1 3/16	1 3/16	1 3/4	2 1/16	2 1/16	2 3/16	4.83	....
	2½	1	1	1	1 3/4	1 13/16	1 13/16	2 3/16	4.48	4.65
		¾	1 1/16	1 1/16	1 3/4	1 1/2	1 1/4	2 1/4	4.29	....
		½	1 3/16	1 3/16	1 3/4	1 7/16	1 3/16	2 3/16	4.00	....
2½	2½	2	1 5/16	1 7/16	1 5/16	2 1/16	2 5/16	2 1/16	6.00	....
	2	2	1 3/16	1 3/16	1 7/16	2 1/16	2 1/16	2 1/16	5.17	5.24
		1½	1 3/16	1 3/16	1 3/16	2 3/16	2	2 3/16	4.42	....
		1¼	1 3/16	1 3/16	1 3/4	2 1/16	1 7/16	2 3/16	4.26	....
		1	1	1 1/16	1 3/4	1 13/16	1 3/4	2 3/16	3.92	....
		¾	1 1/16	1 1/16	1 3/4	1 3/4	1 7/16	2 1/4	3.62	....
		½	1 3/16	1 3/16	1 3/4	1 7/16	1 1/2	2 3/16	3.57	....

cast iron threaded | **125 lb, standard** | pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

tees, *cont'd*

reducing tee
fig. 359



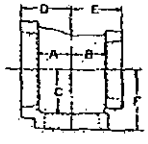
A, B, C:
center to end of pipe

D, E, F:
center to face of fitting

size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
2½	1½	2½	1 13/16	1 13/16	1 13/16	2 11/16	2 7/16	2 11/16	5.82	....
		2	1 7/8	1½	1⅞	2⅞	2½	2⅞	4.85	....
		1½	1 15/16	1 15/16	1 13/16	2 15/16	1 15/16	2 15/16	4.23	....
	1¼	2½	1 13/16	1¾	1 13/16	2 11/16	2¾	2 11/16	5.40	....
		2	1 7/8	1½	1⅞	2⅞	2⅜	2⅞	4.96	....
		1½	1 15/16	1 15/16	1 13/16	2 15/16	2¼	2 15/16	4.28	....
	1	2½	1 13/16	1¾	1 13/16	2 11/16	2⅝	2 11/16	5.36	....
		2	1 7/8	1 15/16	1⅞	2 15/16	2⅛	2 15/16	5.03	....
	¾	2½	1 13/16	1¾	1 13/16	2 11/16	2¼	2 11/16	5.10	....
	½	2½	1 13/16	1 13/16	1 13/16	2 11/16	2¼	2 11/16	5.20	....
		2	1 7/8	1 13/16	1⅞	2 15/16	2⅛	2 15/16	5.29	....
2	2		1⅞	1⅞	1 15/16	2 15/16	2⅜	2 15/16	5.17	5.38
2	1½		1⅞	1 13/16	1 15/16	2 15/16	2⅜	2 15/16	5.46	....
2	1¼	2½	1⅞	1¾	1 15/16	2 15/16	2¼	2 15/16	4.54	....
2	1		1⅞	1 13/16	1 15/16	2 15/16	2⅜	2 15/16	4.88	....
1½	1½		1 13/16	1 13/16	1 15/16	2 15/16	2 7/16	2 15/16	4.15	....
		2½	1⅞	1⅞	2⅛	2 13/16	2 13/16	3 1/16	8.92	8.96
		2	1 15/16	1 15/16	2 3/16	2⅝	2⅝	2⅞	7.75	7.83
		1½	1⅞	1⅞	2 3/16	2⅝	2⅝	2 13/16	7.10	7.27
	3	1¼	1¼	1¼	2⅛	2 3/16	2 7/16	2¾	6.75	6.92
		1	1	1	2⅛	2 3/16	2 3/16	2 13/16	6.27	6.54
		¾	15/16	15/16	2⅛	1⅞	1⅞	2⅝	6.06	6.17
		½	15/16	15/16	2 1/16	1¾	1⅞	2⅝	6.08	6.17
		3	2⅛	2¼	2⅛	3⅛	3 1/16	3 1/16	8.13	....
		2½	1⅞	1 13/16	2⅛	2 13/16	2 13/16	3 1/16	7.66	....
		2	1 15/16	1½	2 3/16	2⅝	2⅝	2 13/16	6.81	6.98
	2½	1½	1⅜	1⅜	2 3/16	2⅝	2⅝	2 13/16	6.23	6.33
		1¼	1¼	1⅜	2⅛	2⅜	2⅜	2¾	5.92	....
		1	1	15/16	2⅛	2 1/16	1 13/16	2 13/16	5.51	....
3		½	1 1/16	1	2¼	2 1/16	1 13/16	2 13/16	5.93	....
		3	2⅛	2¼	2⅛	3¼	2 13/16	3¼	8.79	....
		2½	1⅞	1 13/16	2⅛	2 13/16	2⅝	3 1/16	7.10	....
	2	2	1 15/16	1⅞	2 3/16	2⅝	2⅜	2 13/16	7.29	....
		1½	1⅜	1⅜	2 3/16	2⅝	2⅜	2 13/16	6.83	....
	1½	3	2⅛	2 3/16	2⅛	3¼	2 13/16	3⅛	8.13	....
		2½	1⅞	1⅞	2⅛	2 13/16	2⅝	3 1/16	7.67	....
	1¼	3	2⅛	2⅛	2⅛	3⅛	2 13/16	3⅛	8.46	....
		2½	1⅞	1 13/16	2⅛	2 13/16	2⅝	3 1/16	7.69	....
	1	3	2⅛	2⅛	2⅛	3⅛	2 13/16	3⅛	8.30	....
		2½	1⅞	1 13/16	2⅛	2 13/16	2⅝	3 1/16	8.03	....
	¾	3	2⅛	2⅛	2⅛	3⅛	2 13/16	3⅛	8.25	....
	½	3	2⅛	2¼	2⅛	3⅛	2 13/16	3¼	7.60	....
2½	2½		2⅛	2⅛	1⅞	3 1/16	3 1/16	2 13/16	8.09	8.35
2½	2		2⅛	2⅛	1⅞	3 1/16	2 13/16	2 13/16	7.35	....
2½	1½	3	2⅛	2⅛	1⅞	3 1/16	2 13/16	2 13/16	7.99	....
2½	1¼		2⅛	2⅛	1⅞	3 1/16	2 13/16	2 13/16	7.73	....
2½	1		2⅛	2⅛	1⅞	3 1/16	2 13/16	2 13/16	8.03	....
2	2		2 3/16	2 3/16	1½	2⅞	2⅞	2½	7.87	....
		3	2 3/16	2 3/16	2⅛	3 3/16	3 3/16	3 3/16	12.00	....
		2½	1 13/16	1 13/16	2⅛	2⅞	2⅞	3 1/16	10.95	....
		2	1⅝	1⅝	2⅛	2⅞	2⅝	3 1/16	9.94	....
3½	3½	1½	1⅞	1⅞	2⅛	2⅞	2⅝	3 1/16	8.87	....
		1¼	1¼	1¼	2⅛	2⅞	2¼	3	8.63	....
		1	1 1/16	1 1/16	2⅛	2⅞	2⅛	2 13/16	8.00	....

tees, *cont'd*

reducing tee
fig. 359



A, B, C:
center to end of pipe

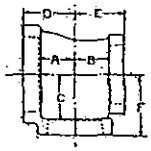
D, E, F:
center to face of fitting

size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
3½	3	3½	2⅜	2⅜	2¼	3⅜	3¼	3⅜	13.95	....
		3	2⅜	2⅛	2⅜	3⅜	3⅛	3⅜	11.33	....
		2½	1¹⁵⁄₁₆	1⅞	2⅜	2⅞	2¹³⁄₁₆	3⅜	10.00	....
		2	1⅝	1⅝	2¼	2⅝	2⅝	3⅜	8.66	....
		1½	1⅜	1⅜	2¼	2⅜	2⅜	3⅜	8.33	....
		1¼	1¼	1¼	2¼	2¼	2⅜	3	7.79	....
		1	1⅛	1	2⅛	2⅛	2⅛	2¹⁵⁄₁₆	7.74	....
	2½	3½	2⅜	2⅜	2¼	3⅜	3⅜	3⅜	12.56	....
		3	2⅜	2⅛	2⅜	3⅜	3⅛	3⅜	11.77	....
		2½	1¹⁵⁄₁₆	1¾	2⅜	2⅞	2¹³⁄₁₆	3⅜	10.69	....
		2	1⅝	1⅝	2¼	2⅝	2⅝	3⅜	9.86	....
	2	3½	2⅜	2¼	2⅜	3⅜	3⅜	3⅜	12.93	....
		3	2⅜	2⅛	2⅜	3⅜	3⅛	3⅜	12.75	....
	1½	3½	2⅜	2¼	2⅜	3⅜	3⅜	3⅜	12.78	....
		3	2⅜	2¼	2⅜	3⅜	3⅛	3⅜	12.56	....
	1¼	3½	2⅜	2⅜	2⅜	3⅜	3⅜	3⅜	12.80	....
		3	2⅜	2⅛	2⅜	3⅜	3⅛	3⅜	12.54	....
	1	3½	2⅜	2⅜	2⅜	3⅜	3⅜	3⅜	12.81	....
3	3	3½	2⅜	2⅜	2¼	3¼	3¼	3¼	11.10	....
3	2½		2⅜	2⅜	2¼	3¼	3⅛	3¼	11.93	....
3	2		2⅜	2⅜	2¼	3⅜	3¼	3⅜	12.19	....
3	1½		2⅜	2⅜	2¼	3⅜	3¼	3⅜	12.52	....
2½	2½		2⅜	2⅜	1¹⁵⁄₁₆	3⅜	3⅛	2⅞	9.19	....
4	4	3½	2½	2½	2¹³⁄₁₆	3¼	3¼	3¼	18.11	....
		3	2¼	2¼	2¹³⁄₁₆	3¼	3¼	3⅝	14.12	14.69
		2½	2	2	2⅜	2¹³⁄₁₆	2¹³⁄₁₆	3⅜	12.85	12.96
		2	1¹³⁄₁₆	1¹³⁄₁₆	2¼	2¹³⁄₁₆	2¹³⁄₁₆	3½	11.63	11.73
		1½	1⅝	1⅝	2¹³⁄₁₆	2¾	2¾	3⅝	10.75	11.18
		1¼	1¾	1¾	2⅝	2¾	2¾	3⅝	10.38	10.54
		1	1¾	1¾	2⅝	2¾	2⅝	3⅝	10.40	10.81
		¾	1	1	2⅝	2¾	2¾	3⅝	10.58	10.83
	3½	4	2¼	2¹³⁄₁₆	2¼	3¼	3¼	3¼	17.23	....
		3½	2½	2⅝	2¹³⁄₁₆	3½	3⅜	3¹³⁄₁₆	14.38	....
		3	2¼	2⅜	2¹³⁄₁₆	3½	3¼	3⅝	14.63	....
		2½	2	1¹³⁄₁₆	2⅝	2¹⁵⁄₁₆	2⅞	3⅜	11.84	....
		2	1¾	1⅝	2¼	2¹³⁄₁₆	2⅝	3½	10.90	....
		1½	1¾	1¾	2¹³⁄₁₆	2⅞	2⅞	3⅝	10.09	....
		1¼	1¾	1¼	2⅝	2¾	2¼	3⅜	9.56	....
4		1	1⅜	1⅛	2⅝	2⅝	2¼	3⅜	9.90	....
	3	4	2¼	2¹³⁄₁₆	2¼	3¼	3⅝	3¼	15.04	....
		3½	2½	2⅝	2¹³⁄₁₆	3½	3⅜	3¹³⁄₁₆	14.74	....
		3	2¼	2⅜	2¹³⁄₁₆	3¼	3⅛	3⅝	12.50	....
		2½	2	1⅞	2⅝	2¹⁵⁄₁₆	2¹³⁄₁₆	3⅜	11.25	....
		2	1¾	1⅝	2¼	2¹³⁄₁₆	2⅝	3½	10.21	10.67
		1½	1⅝	1⅝	2¹³⁄₁₆	2⅞	2⅞	3⅝	10.20	....
		1¼	1⅝	1⅝	2⅝	2⅝	2¼	3⅜	9.70	....
	2½	4	2¼	2⅜	2¼	3¼	3⅜	3¼	15.75	....
		3½	2½	2⅜	2¹³⁄₁₆	3½	3⅜	3¹³⁄₁₆	15.23	....
		3	2¼	2⅛	2¹³⁄₁₆	3¼	3⅛	3⅜	13.06	....
		2½	2	1¹³⁄₁₆	2⅝	2¹⁵⁄₁₆	2¹³⁄₁₆	3⅜	11.78	....
	2	4	2¼	2¼	2¼	3¼	3½	3¼	13.19	....
		3½	2½	2⅛	2¹³⁄₁₆	3½	3⅜	3¹³⁄₁₆	14.15	....
		3	2¼	2¼	2¹³⁄₁₆	3¼	3¼	3¼	13.44	....
		2	1¹³⁄₁₆	1¾	2¼	2¹³⁄₁₆	2¾	3½	11.34	....

cast iron threaded | **125 lb, standard** | pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

tees, *cont'd*

reducing tee
fig. 359



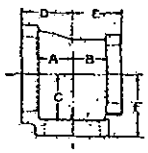
A, B, C:
center to end of pipe

D, E, F:
center to face of fitting

size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
4	1½	4	2¾	2¹³⁄₁₆	2¾	3¾	3½	3¾	13.47	....
	1¼	4	2¾	2⅝	2¾	3¾	3½	3¾	14.35	....
	1	4	2¾	2⅝	2¾	3¾	3½	3¾	13.52	....
	¾	4	2¾	3¼	2¾	3¾	3½	3¾	13.20	....
3½	3½	4	2¹³⁄₁₆	2¹³⁄₁₆	2½	3¹¹⁄₁₆	3¹³⁄₁₆	3½	14.25	....
3½	3		2¹³⁄₁₆	2¹³⁄₁₆	2½	3¹¹⁄₁₆	3¹³⁄₁₆	3½	15.23	....
3½	2½		2¹³⁄₁₆	2⅝	2½	3¹¹⁄₁₆	3¹³⁄₁₆	3½	15.27	....
3½	2		2¹³⁄₁₆	2¼	2½	3¹¹⁄₁₆	3¹³⁄₁₆	3½	15.81	....
3	3		2¹³⁄₁₆	2¹³⁄₁₆	2¼	3⅝	3⅜	3¼	12.80	....
3	2½		2¹³⁄₁₆	2⅝	2¼	3⅝	3⅜	3¼	13.34	....
2½	2½		2¾	2⅝	2	3¾	3⅜	3¼	14.03	....
2	2		2¾	2¾	1¹¹⁄₁₆	3⅝	3⅜	2¼	16.07	....
5	4	4	2¹³⁄₁₆	2¹³⁄₁₆	3⅜	4	4	4¼	23.83	24.79
	3½		2¹⁵⁄₁₆	3¹⁄₁₆	3¹⁄₁₆	4	4	4¼	24.17	....
	3		2¹⁵⁄₁₆	2¹⁵⁄₁₆	3¼	3½	3½	4⅜	20.00	20.80
	2½		2¹⁵⁄₁₆	2¹⁵⁄₁₆	3¹⁄₁₆	3¹⁄₁₆	3¹⁄₁₆	4¼	18.84	19.25
	2		1¾	1¾	3⅜	2¹³⁄₁₆	2¹³⁄₁₆	4⅛	17.43	17.84
	1½		1¾	1¾	3⅜	2¹³⁄₁₆	2¹³⁄₁₆	4	16.21	....
	1¼		1¾	1¾	3½	2⅝	2⅝	3¹⁵⁄₁₆	15.75	....
	1		1¼	1¼	3¼	2⅝	2⅝	3¹⁵⁄₁₆	15.78	16.31
	5	4	3¹⁄₁₆	3⅜	3¹⁄₁₆	4½	4⅜	4½	26.33	....
	4		2¹³⁄₁₆	2¾	3⅜	4	3¾	4¼	20.58	....
	3½		2⅝	2½	3¹⁄₁₆	3¾	3½	4⅛	19.19	....
	3		2⅝	2¼	3¼	3½	3½	4⅜	24.05	....
	2½		2⅛	2	3¹⁄₁₆	3¹⁄₁₆	3¹⁄₁₆	4¼	21.81	....
	2		1¾	1¹¹⁄₁₆	3¹⁄₁₆	2¹³⁄₁₆	2¹³⁄₁₆	4¼	15.42	....
	1½		1¾	1¾	3¼	2¹³⁄₁₆	2⅝	4	13.75	....
	1¼		1⅝	1⅝	3¼	2¹³⁄₁₆	2⅝	4	14.33	....
	3½	5	3¹⁄₁₆	3⅛	3¹⁄₁₆	4½	4⅜	4½	26.75	....
		4	2¹³⁄₁₆	2¹¹⁄₁₆	3⅜	4	3¾	4¼	22.76	....
		3½	2⅝	2½	3⅛	3¾	3½	4⅛	20.23	....
		3	2⅝	2⅜	3¼	3½	3½	4⅜	23.22	....
	3	5	3⅛	3¼	3⅛	4½	4⅜	4½	23.38	....
		4	2¹³⁄₁₆	2¹⁵⁄₁₆	3⅜	4	3¾	4⅜	23.53	....
		3½	2⅝	2⅝	3⅛	3¾	3½	4⅛	20.91	....
	2½	5	3⅛	3⅛	3⅛	4½	4¼	4½	22.12	....
		4	2¹⁵⁄₁₆	2⅝	3⅛	4	3¾	4⅜	24.56	....
	2	5	3⅛	3¼	3⅛	4½	4¼	4½	22.41	....
	1½	5	3⅛	3⅛	3⅛	4½	4¼	4½	23.44	....
	1¼	5	3⅛	3¼	3⅛	4½	4¼	4½	23.55	....
4	4	5	3⅜	3¾	2¹³⁄₁₆	4¾	4⅜	4	20.88	....
4	3½		3⅜	3⅜	2¹³⁄₁₆	4⅜	4⅜	4	20.57	....
4	3		3⅜	3⅜	2¹³⁄₁₆	4⅜	4⅜	4	20.66	....
4	2½		3⅜	3¼	2¹³⁄₁₆	4⅜	4⅜	4	22.37	....
3½	3½		3⅜	3⅜	2⅝	4⅜	4⅜	3¾	19.66	....
3½	3		3⅜	3⅜	2⅝	4⅜	4⅜	3¾	20.28	....
3	3		3⅜	3⅜	2⅝	4⅜	4⅜	3¾	20.25	....
6	6	5	3⅜	3⅜	3¹⁵⁄₁₆	4⅜	4⅜	5	37.00	....
		4	2⅞	2⅞	3⅞	4⅛	4⅛	4¹³⁄₁₆	32.44	33.74
		3½	2⅞	2⅞	3¾	4⅛	4⅛	4¹³⁄₁₆	33.54	....
		3	2⅞	2⅞	3¹³⁄₁₆	3⅞	3⅞	4¹³⁄₁₆	27.46	28.56
		2½	2⅞	2⅞	3¹³⁄₁₆	3¼	3¼	4¾	25.67	27.00
		2	1¹⁵⁄₁₆	1¹⁵⁄₁₆	3⅞	3	3	4⅝	24.65	25.63
		1½	1⅝	1⅝	3⅞	2¾	2¾	4½	22.53	....
		1¼	1½	1½	3¹³⁄₁₆	2¾	2¾	4⅜	22.36	....
		1	1⅜	1⅜	3¾	2⅝	2⅝	4⅜	22.69	....

tees, *cont'd*

reducing tee
fig. 359



A, B, C:
center to end of pipe

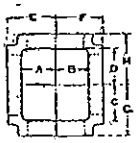
D, E, F:
center to face of fitting

size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
6	5	6	3⅞	3¹³⁄₁₆	3⅞	5⅛	5⅛	5⅛	43.31	....
		5	3⅞	3¾	3¹³⁄₁₆	4⅞	4½	5	32.00	....
		4	2⅞	2¹³⁄₁₆	3⅞	4¾	4	4⅛	28.20	....
		3½	2⅞	2¾	3¾	4¾	4	4⅛	28.14	....
		3	2¾	2¾	3¹³⁄₁₆	3⅞	3¾	4⅛	30.34	....
		2½	2⅛	2¾	3¹³⁄₁₆	3¼	3¾	4¼	22.88	....
		2	1¹³⁄₁₆	1¾	3⅞	3	3	4⅛	23.48	....
		1½	1¾	1¾	3⅞	2¾	2¾	4½	25.81	....
		1¼	1½	1½	3⅞	2⅝	2⅝	4⅛	25.44	....
	4	6	3⅞	3⅞	3⅞	5⅛	4¹³⁄₁₆	5⅛	34.22	....
		5	3⅞	3⅞	3¹³⁄₁₆	4⅞	4½	5	36.32	....
		4	2⅞	2¾	3¾	4¾	4	4⅛	30.00	....
		3	2⅝	2½	3⅞	3⅞	3⅞	4⅛	31.75	....
	3½	6	3⅞	3⅞	3⅞	5⅛	4¹³⁄₁₆	5⅛	35.31	....
		5	3⅞	3¾	3¹³⁄₁₆	4⅞	4½	5	35.50	....
	3	6	3⅞	3¹³⁄₁₆	3⅞	5⅛	4¹³⁄₁₆	5⅛	33.72	....
		5	3⅞	3¼	3¹³⁄₁₆	4⅞	4½	5	35.00	....
		4	2¹³⁄₁₆	3	3⅞	4¼	4	4¹³⁄₁₆	32.25	....
		3	2⅞	2⅞	3¹³⁄₁₆	3¾	3¾	4¹³⁄₁₆	35.23	....
	2½	6	3⅞	3¹³⁄₁₆	3⅞	5⅛	4¹³⁄₁₆	5⅛	34.57	....
	2	6	3⅞	3⅞	3⅞	5⅛	4¹³⁄₁₆	5⅛	35.21	....
	1½	6	3⅞	3⅞	3⅞	5⅛	4¹³⁄₁₆	5⅛	34.67	....
	1¼	6	3⅞	4¹⁄₁₆	3⅞	5⅛	4¹³⁄₁₆	5⅛	36.29	....
5	5	6	3¹³⁄₁₆	3¹³⁄₁₆	3⅜	5	5	4⅜	32.91	....
5	4		3¹³⁄₁₆	3⅞	3⅜	5	5	4⅜	33.51	....
5	3½		3¹³⁄₁₆	3¾	3⅜	5	4¹³⁄₁₆	4⅜	29.26	....
5	3		3¹³⁄₁₆	3¾	3⅜	5	4¹³⁄₁₆	4⅜	31.13	....
4	4		3⅞	3⅞	2⅜	4¹³⁄₁₆	4¹³⁄₁₆	4⅛	26.36	....
4	3½		3⅞	3⅞	2⅜	4¹³⁄₁₆	4¹³⁄₁₆	4⅛	27.25	....
8	8	6	4¾	4¾	5⅜	5⅝	5⅝	6⅜	66.22	....
		5	3¾	3¾	5⅛	5⅝	5⅝	6⅜	67.81	....
		4	3⅞	3⅞	5⅛	4½	4½	6⅛	53.62	....
	6	3½	3¼	3¼	5¼	4½	4½	6¼	54.21	....
		3	2⅝	2⅝	5⅛	4½	4½	6⅛	54.97	....
		2½	2⅝	2⅝	5⅛	3¹³⁄₁₆	3¹³⁄₁₆	6	45.23	....
		2	2⅝	2⅝	5⅛	3⅜	3⅜	5⅞	44.49	....
8	6	8	5⅜	5¼	5⅜	6⅝	6⅝	6⅝	91.50	....
		6	4¾	3⅞	5½	5⅝	5⅝	6¼	73.72	....
		5	3⅝	3⅝	5⅛	5⅛	5⅛	6⅜	76.60	....
		4	3⅛	3¼	5⅛	4½	4½	6⅛	62.28	....
	5	5	4¼	4¼	5¼	5⅛	5⅛	6⅜	77.58	....
	4	8	5⅛	5⅛	5⅜	6⅝	6⅝	6⅝	102.18	....
	2	8	5⅜	5½	5⅜	6⅝	6⅝	6⅝	101.11	....
6	6	8	5⅛	5⅛	4⅜	6¼	6¼	5⅝	58.05	....
6	5		5⅛	5⅜	4⅜	6¼	6¼	5⅝	65.79	....
5	5		5⅜	5⅜	4⅜	6⅜	6¼	5⅝	67.92	....

cast iron threaded | **125 lb, standard** | pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

crosses

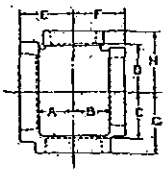
straight cross
fig. 360



A, B, C, D: center to end of pipe
E, F, G, H: center to face of fitting

size, in.	A, B in.	C, D in.	E, F in.	G, H in.	wgt (approx) each, lb. black
¾	1 5/16	1 5/16	1 3/4	1 5/8	1.03
1	1 5/8	1 5/16	1 1/2	1 1/2	1.59
1¼	1¼	1⅜	1¾	1¾	2.42
1½	1 5/8	1 5/8	1 15/16	1 15/16	3.21
2	1 7/8	1 7/8	2¼	2¼	5.08
2½	1 13/16	1 13/16	2 1/4	2 1/16	8.07
3	2 1/16	2 1/16	3⅛	3⅛	11.84
4	2¼	2¼	3 1/16	3 1/16	19.63
5	3 3/4	3 5/16	4½	4½	31.16
6	3⅜	3⅜	5 5/16	5¼	47.67

reducing cross
fig. 361

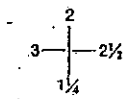


A, B, C, D:
center to end of pipe

E, F, G, H:
center to face of fitting

size, in.				A in.	B in.	C in.	D in.	E, F in.	G, H in.	wgt (approx) each, lb. black
1	1	¾	¾	1 3/16	1 3/16	1 3/4	1 5/16	1⅜	1⅜	1.30
1¼	1¼	1	1	1 3/16	1 5/16	1⅛	1⅛	1⅜	1 11/16	2.04
1½	1½	1¼	1	1⅛	1⅛	1 3/16	1 3/16	1 3/16	1⅞	3.90
		1	1	1	1	1¼	1⅛	1⅜	1 11/16	2.51
		1¼	1	1	1	1¼	1¼	1⅜	1 11/16	2.67
		1	1	1	1⅛	1¼	1¼	1⅜	1 11/16	2.74
2	2	1½	1½	1¼	1½	1 3/16	1 3/16	2	2⅛	4.08
		1¼	1¼	1⅛	1⅛	1 3/16	1 3/16	1⅞	2⅛	4.00
		1	1	1 3/16	1 3/16	1⅞	1 3/16	1⅜	2	3.22
	1½	1¼	1¼	1 3/16	1 3/16	1½	1½	1⅞	2¼	4.18
		1¼	1	1¼	1 3/16	1½	1 3/16	1⅞	2⅛	4.25
		1	1	1 3/16	1⅞	1 3/16	1 3/16	1¼	2	3.57
2½	2	2	2	1¼	1 3/16	1 13/16	1 13/16	2¼	2 1/16	6.82
		1½	1½	1¼	1¼	1⅞	1⅞	2 3/16	2 1/16	5.68
		1¼	1¼	1¼	1¼	1 15/16	1 15/16	2¼	2¼	5.56
		1¼	1¼	1⅛	1⅛	1 15/16	1 15/16	2¼	2¼	5.26
		1¼	1	1 3/16	1 3/16	1¾	1 15/16	2 1/16	2⅛	5.39
		1	1	1	1	1 13/16	1 13/16	1 15/16	2¼	5.06
2½	2	2	2	1½	1⅝	1⅞	1⅞	2¼	2⅛	7.23
		1½	1½	1¼	1⅝	1⅞	1⅞	2¼	2⅛	6.13
	2	1¼	1¼	1½	1⅝	1 15/16	1 15/16	2⅛	2⅛	5.88
		1¼	1	1⅛	1⅝	1 15/16	1 15/16	2¼	2⅛	5.86
		1	1	1	1⅝	1 15/16	1 15/16	1 15/16	2¼	5.11
	1½	1½	1	1⅝	1⅝	1⅞	1 15/16	2¼	2¼	6.51
		1¼	1¼	1⅛	1⅝	1 15/16	1 15/16	2⅛	2⅛	6.01
3	3	2½	2½	1⅞	1⅞	2¼	2¼	2 13/16	3⅛	9.96
		2	2	1⅝	1⅝	2⅛	2⅛	2⅛	2 13/16	8.85
		2	1½	1⅝	1⅝	2⅛	2⅛	2⅛	2 13/16	9.25
		1½	1½	1⅝	1⅝	2⅛	2⅛	2⅛	2 13/16	7.91
		1¼	1¼	1⅝	1⅝	2⅛	2⅛	2⅛	2 13/16	7.92
		1¼	1¼	1⅜	1⅜	2¼	2¼	2⅛	2¼	7.21
		1¼	1	1⅜	1⅜	2¼	2¼	2⅛	2¼	7.25
		1	1	1⅜	1⅜	2	2	2⅛	2 1/16	6.70
	2½	2½	2	1 13/16	1⅞	2⅜	2⅜	2 13/16	3⅛	11.22
		2	2	1⅝	1 13/16	2¼	2¼	2⅛	2 13/16	9.62
		2	1½	1⅜	1 13/16	2¼	2¼	2⅛	2 13/16	9.81
		2	1¼	1⅝	1 13/16	2¼	2⅛	2⅛	2 13/16	10.03
		1½	1½	1⅜	1⅞	2⅛	2⅛	2⅛	2 13/16	8.37
		1¼	1¼	1⅜	1⅝	2⅛	2⅛	2⅛	2¼	7.87
		1¼	1	1¼	1⅝	2¼	2⅛	2⅛	2¼	8.13
		1	1	1⅛	1¼	2¼	2¼	2⅛	2 1/16	7.47
3½	3½	3	3	2⅛	2⅛	2⅛	2⅛	3⅛	3⅜	13.69
		2½	2½	1⅞	1⅞	2⅛	2⅛	2⅞	3⅜	12.19
		2	2	1⅝	1⅝	2½	2½	2⅜	3⅜	11.00
		2	1½	1⅜	1⅝	2½	2⅛	2⅜	3⅜	11.19
		2	1¼	1⅜	1⅝	2½	2⅛	2⅜	3⅜	11.59
		1½	1½	1⅜	1⅜	2⅜	2⅛	2⅜	3⅛	9.47
		1½	1¼	1⅜	1⅜	2⅛	2⅛	2⅜	3⅛	9.75
		1½	1	1⅜	1⅜	2⅛	2½	2⅜	3⅛	10.00
		1¼	1¼	1¼	1¼	2⅜	2⅜	2¼	3	9.09
		1	1	1¼	1¼	2⅜	2⅛	2¼	3	9.28

Reducing Crosses are read thus:



3 x 2½ x 2 x 1¼

crosses, *cont'd*

size, in.				A in.	B in.	C in.	D in.	E, F in.	G, H in.	wgt (approx) each, lb. black
reducing cross fig. 361										
3½	3	2½	2½	1⅞	1⅞	2⅛	2⅛	2⅛	3⅝	13.07
		2½	2	1¾	1¾	2⅛	2⅛	2⅛	3⅝	13.00
		2	2	1⅝	1⅝	2½	2½	2⅜	3⅝	11.50
		2	1½	1¾	1¾	2½	2⅝	2⅜	3⅝	11.88
		2	1¼	1⅝	1⅝	2½	2⅝	2⅜	3⅝	11.80
		1½	1½	1⅝	1⅝	2⅜	2⅜	2⅜	3⅝	10.28
		1½	1¼	1⅝	1⅝	2⅜	2⅜	2⅜	3⅝	10.50
		1½	1	1⅝	1⅝	2⅜	2½	2⅜	3⅝	10.56
		1¼	1¼	1½	1⅝	2⅜	2⅜	2½	3	9.78
		1	1	1¼	1⅝	2⅜	2⅜	2¼	3	10.16
	4	3½	3½	2⅛	2⅛	2¾	2¾	3¼	3¾	21.44
		3	3	2⅛	2⅛	2⅛	2⅛	3¼	3¾	15.51
		2½	2½	2	2	2⅛	2⅛	2⅛	3⅝	14.07
		2½	2	1⅞	1⅞	2⅛	2⅜	2⅛	3⅝	14.88
		2½	1½	2	2	2⅜	2⅛	2⅛	3⅝	14.38
		2	2	1⅛	1⅛	2⅛	2⅛	2⅛	3¼	12.00
		2	1½	1⅝	1⅝	2⅛	2⅜	2⅛	3¼	12.56
		1½	1½	1⅜	1⅜	2⅛	2⅛	2⅜	3⅝	11.82
		1¼	1¼	1¼	1¼	2⅛	2⅛	2⅜	3⅝	10.75
		1	1	1¼	1¼	2¼	2¼	2⅜	3⅝	11.09
	3½	2½	2½	1⅞	1⅞	2⅛	2⅛	2⅛	3⅝	14.75
		2½	1	1⅞	1⅞	2⅛	3	2⅛	3⅝	15.66
		2	2	1⅝	1⅝	2⅛	2⅛	2⅛	3½	13.00
		2	1½	1⅝	1⅝	2⅛	2⅜	2⅛	3½	13.22
		1½	1½	1¾	1¾	2⅛	2⅛	2⅜	3⅝	12.06
		1½	1	1⅜	1⅜	2⅛	2¼	2⅜	3⅝	12.56
		1¼	1¼	1¼	1⅜	2⅛	2⅛	2⅜	3⅝	11.47
		1¼	1	1¼	1⅜	2⅛	2¼	2⅜	3⅝	11.70
	3	2½	2	1⅞	2	2⅛	2⅜	2⅛	3⅝	15.92
		2	2	1⅝	1⅞	2⅛	2⅛	2⅛	3½	13.50
		2	1½	1⅝	1⅝	2⅛	2¼	2⅛	3½	13.62
		2	1¼	1⅝	1⅝	2⅛	2⅛	2⅜	3⅝	13.75
		1½	1½	1⅜	1⅝	2⅛	2⅜	2⅛	3⅝	13.50
Reducing Crosses are read thus:										
2 / 3 — 2½ / 1¼	5	4	4	2⅛	2⅛	3⅛	3⅛	4	4⅜	28.50
3 x 2½ x 2 x 1¼		3½	3½	2⅛	2⅛	3⅛	3⅛	4	4⅜	29.47
		3	3	2⅛	2⅛	3⅛	3⅛	3½	4⅜	22.91
		2½	2½	2	2	3⅛	3⅛	3⅜	4¼	19.56
		2½	2	2	2	3⅛	3½	3⅜	4¼	20.13
		2	2	1¾	1¾	3⅛	3¼	2⅞	4¼	18.25
		2	1½	1¾	1¾	3⅛	3½	2⅞	4¼	18.91
		1½	1½	1½	1½	3⅛	3⅜	2⅞	4	16.63
		1½	1¼	1½	1½	3⅛	3⅜	2⅞	4	17.03
		1¼	1¼	1⅜	1⅜	3⅛	3⅛	2⅞	3⅞	16.25
	4	3	3	2⅝	2⅝	3⅛	3⅛	3½	4⅜	23.81
		2½	2½	2	2⅛	3⅛	3⅛	3⅜	4¼	23.12
		2½	2	2	2⅛	3⅛	3⅛	3⅜	4¼	22.47
		2	2	1¾	1⅞	3⅛	3⅜	2⅞	4⅛	20.83
		1½	1½	1½	1⅝	3⅛	3⅜	2⅞	4	18.81
	6	5	5	3⅛	3⅛	3⅜	3⅜	4⅜	5	39.25
		4	4	2⅞	2⅞	3⅜	3⅜	4⅛	4⅞	33.40
		3½	3½	2⅞	2⅞	3⅜	3⅜	4⅛	4⅞	34.75
		3	3	2⅝	2⅝	3⅜	3⅜	3⅞	4⅞	30.06
		2½	2½	2⅛	2⅛	3⅜	3⅛	3½	4¾	26.44
		2½	2	2	2	3⅜	4⅛	3½	4¾	27.38
		2	2	1¾	1¾	3⅜	3⅜	3⅜	4¾	25.38
		1½	1½	1½	1½	3⅜	3⅛	2¾	4½	23.69
		1¼	1¼	1⅜	1⅜	3⅜	3⅜	2⅝	4⅜	22.88
	5	3	3	2⅝	2⅝	3⅛	3⅛	3⅜	4⅞	32.88
		2	2	1¾	1⅞	3⅜	3⅜	3	4⅝	28.44
		1½	1½	1½	1¾	3⅛	3⅛	2¾	4½	25.75
8	8	6	6	4⅜	4⅜	5⅛	5⅛	5⅜	6⅜	71.44
		5	5	4⅜	4⅜	5⅜	5⅜	5⅜	6⅜	80.44
		4	4	3⅞	3¾	5⅛	5⅛	4½	6⅛	55.56
	6	4	4	3⅞	3¾	5⅛	5⅛	4½	6⅛	62.75

A, B, C, D:
center to end of pipe

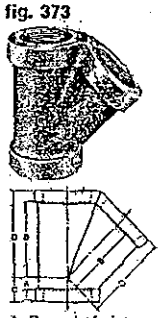
E, F, G, H:
center to face of fitting

cast iron threaded | **125 lb, standard**

pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

lateral

fig. 373



A, B: end of pipe
C, D: center to face of fitting

size, in.	A in.	B in.	C in.	D in.	weight (approx) each, lb. black
¾	¼	1¾	¾	2¼	1.00
1	5/16	2 5/16	¾	2¼	1.62
1¼	⅜	2⅝	1	3¼	2.63
1½	7/16	3 3/16	1 1/16	3 11/16	3.57
2	½	3 11/16	1¼	4½	5.75
2½	⅝	4 5/16	1½	5 5/16	8.99
3	11/16	5 5/16	1¾	6⅛	13.54
4	1 1/16	6 5/16	2⅛	7⅝	21.30

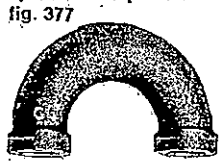
return bends

close pattern, r.h.
fig. 375

open pattern: fig. 376◆

size, in.	center to center, in. close fig. 375	center to center, in. open fig. 376	weight (approx) each lb., black close	weight (approx) each lb., black open
½	1¼	...	.65	•
¾	1½	1⅞	1.10	.98
1 ◆	1¾	2½ ◆	1.71	1.48
1¼ ◆	2¼	3 ◆	2.39	2.41
1½ ◆	2½	3½ ◆	3.46	3.33
2	3¼	4½	6.73	5.78
2½	...	5½	•	9.73
3	...	6½	•	13.92

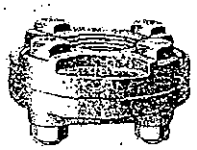
special wide pattern
fig. 377



size, in.	center to center, in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1	3	•	•
1	4	2.20	•
1¼	4	3.50	•
1¼	6	3.74	•
1½	6	4.95	•
2	6	7.12	•

flange union

gasket type
fig. 487



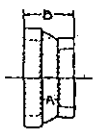
Assembled with gaskets.

size, in.	diam. of flanges, in.	no. of bolts	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
½	2¾	3	1.75	1.80
¾	3	3	2.00	2.05
1	3¼	3	2.25	2.30
1¼	4 5/16	4	4.75	4.85
1½	4⅝	4	5.00	5.10
2	5	4	6.50	6.65
2½	5⅞	4	8.50	8.65
3	6⅞	4	11.00	11.20
3½	6⅞	4	12.75	13.00
4	7 11/16	5	18.00	18.50
5	8 15/16	5	22.00	22.75
6	10¼	6	30.00	31.00
8	12 13/16	8	51.00	52.50

• Not stocked
◆ Available both r.h. and l.h. threads — fig. 376 only.

reducers

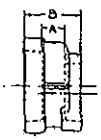
concentric reducer
fig. 367



A: end to end of pipe
B: face to face of fitting
□ hex end — galvanized

size, in.		A in.	B⊛ in.	weight (approx) each, lb. black
¾	½	⅛	1⅜₁₆	.40
1	¾	¼	1½	.63
	½□	¹³⁄₁₆	1¹⁵⁄₁₆	.54
1¼	1	⁵⁄₁₆	2⅛	1.07
	¾	1	2⅛	1.07
	½	⅜	1⅝	.84
1½	1¼	1	2¼	1.45
	1	½	1¾	1.50
	¾	½	1⅝	1.20
	½	½	1⅝	1.00
2	1½	⅞	2⅜₁₆	1.98
	1¼	⁹⁄₁₆	2⅛	1.78
	1	¾	2	1.83
	¾	¾	2	1.90
	½	⅝	2	2.00
2½	2	1	2⅜₁₆	2.98
	1½	¾	2	3.10
3	2½	¹³⁄₁₆	2¹³⁄₁₆	4.40
	2	1⅛	2¾	3.96
4	3½	1⅛	3¾₁₆	7.63
	3	1⅛	3⅛	7.01
	2½	1⅜₁₆	3⅛	7.78
	2	1⅜	2¹⁵⁄₁₆	6.50
5	4	1⅛	3¾₁₆	10.48
6	5	1⅛	3¾₁₆	15.53
	4	1⅛	3¾₁₆	13.83
8	6	1¼	3⅞	29.10

eccentric reducer
fig. 368



A: end to end of pipe
B: face to face of fitting

size, in.		A in.	B⊛ in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
¾	½	⅜₁₆	1½	.45	....
1	¾	⅛	1½	.61	....
	½	½	1⅜₁₆	.57	•
1¼	1	½	1¹¹⁄₁₆	1.00	•
	¾	½	1⅝	.90	....
	½	⁹⁄₁₆	1⅝	.83	....
1½	1¼	⅝	1⅞	1.26	•
	1	⅝	1¾	1.21	....
	¾	⁹⁄₁₆	1¹³⁄₁₆	1.17	....
	½	¹³⁄₁₆	1¾	1.11	....
2	1½	⅞	2⅜₁₆	1.93	•
	1¼	¹³⁄₁₆	2⅛	1.87	....
	1	¹³⁄₁₆	2¼	1.86	....
	¾	¾	2	1.83	....
	½	¾	1¹³⁄₁₆	1.80	....
2½	2	1	2¹³⁄₁₆	2.95	•
	1½	⅞	2⅝	2.94	....
	1¼	⅞	2⅜	2.80	....
	1	¹³⁄₁₆	2¼	2.74	....
3	2½	¹³⁄₁₆	2¹³⁄₁₆	4.80	•
	2	1¼	2¾	4.61	....
	1½	¹³⁄₁₆	2⅝	4.16	....
	1¼	¹³⁄₁₆	2⅜	3.80	....
	1	⅞	2¼	3.95	....
3½	3	¹³⁄₁₆	2¹³⁄₁₆	6.04	•
	2½	1	2⅞	5.61	....
	2	1¼	2¾	5.23	....
	1½	1	2⅝	5.08	....
	1¼	¹³⁄₁₆	2⅜	5.30	....
	1	¹³⁄₁₆	2½	4.96	....
4	3½	1⅛	3¾₁₆	7.55	•
	3	1⅛	3⅛	7.64	•
	2½	1⅛	3¼	7.26	....
	2	1⅛	2¹³⁄₁₆	6.91	....
	1½	1⅛	2¹³⁄₁₆	6.61	....
	1¼	1⅛	2¾	6.58	....
	1	1⅛	2¹³⁄₁₆	6.83	....
5	4	1⅛	3¾₁₆	11.19	•
	3½	1⅛	3¼	10.94	....
	3	1⅛	3¼	11.44	....
	2½	1⅛	3¾₁₆	11.38	....
	2	1⅛	3¾₁₆	10.81	....
6	5	1⅛	3¾₁₆	16.01	•
	4	1⅛	3¾₁₆	15.36	•
	3½	1⅛	3¾	14.81	....
	3	1⅛	3¾₁₆	14.66	....
	2½	1⅛	3¼	14.58	....
	2	1¼	3¾₁₆	15.60	....
8	6	1½	3⅞	28.04	•
	5	1⅜₁₆	3¼	28.14	....

• Not stocked

⊛ Dimension "B" does not conform to ASA Standard.

cast iron threaded — 125 lb, standard

pressure ratings, psi { saturated steam: 125 / liquid & gas at 150° F: 175

bushings

hex bushing
fig. 383

size, in.		weight each, lb. black	weight each, lb. galv.
¼	★ ⅛	.021	.022
⅜	★ ¼	.038	.039
	★ ⅛	.045	.047
½	★ ⅜	.050	.053
	★ ¼	.070	.073
	★ ⅛	.060	.062
¾	★ ½	.103	.105
	★ ⅜	.119	.121
	★ ¼	.100	.105
	★ ⅛	.090	.093
1	★ ¾	.170	.174
	★ ½	.215	.220
	★□ ⅜	.182	.188
	★□ ¼	.186	.192
	★□ ⅛	.208	.216
1¼	★1	.296	.302
	★ ¾	.385	.393
	★□ ½	.300	.305
	★□ ⅜	.290	.295
	★□ ¼	.290	.300
1½	★1¼	.327	.334
	1	.500	.520
	□ ¾	.470	.500
	□ ½	.420	.470
	□ ⅜	.470	.500
	□ ¼	.470	.490
2	★1½	.667	.680
	1¼	.810	.830
	□1	.730	.760
	□ ¾	.710	.750
	□ ½	.770	.780
	□ ⅜	.750	.780
	□ ¼	.750	.800
2½	★2	.920	.950
	1½	1.290	1.340
	□1¼	1.240	1.250
	□1	1.160	1.230
	□ ¾	1.250	1.290
	□ ½	1.280	- - -

face bushing
fig. 385

size, in.		weight each, lb. black	weight each, lb. galv.
½	★ ⅛	.009	.010
⅜	★ ¼	.015	.015
	★ ⅛	.020	.020
½	★ ⅜	.030	.030
	★ ¼	.040	.040
¾	★ ½	.055	.055
	★ ⅜	.065	.065
	★ ¼	.070	.070
1	★ ¾	.085	.090
	★ ½	.120	.125
	★ ⅜	.125	.130
	★ ¼	.135	.140
1¼	★1	.160	.165
	★ ¾	.268	.273
	★ ½	.245	.250
1½	★1¼	.145	.150
	★1	.339	.346
	★ ¾	.391	.398
	★ ½	.320	.330
2	★1½	.345	.350
	★1¼	.540	.549
	★1	.525	.535
	★ ¾	.684	.690
	★ ½	.695	.703
2½	★2	.615	.620
	★1½	.850	.870
	★1¼	.935	.960
3	★2½	.970	.988
	2	1.330	1.380
	1½	1.500	1.560
	1¼	1.540	•
3½	★3	.975	1.000
	2½	1.760	2.000
	2	2.100	2.100
4	★3½	1.140	1.175
	3	1.920	1.960
	2½	2.550	2.650
	2	2.700	2.820
5	★4	2.761	2.789
	3	4.130	4.500
6	★5	3.730	3.780
	4	5.820	6.050
	3	6.900	•
	2½	7.210	7.500
8	★6	9.583	9.669
8	6	13.19	13.5
	□5	13.65	14.0
	□4	13.93	15.0
	□3½	14.60	15.5
	□3	15.50	15.8
6	□4	6.83	7.11
	□3½	7.13	7.40
	□3	7.75	8.06
	□2½	7.72	7.78
	□2	8.00	8.32
5	4	3.94	4.10
	3½	4.83	5.00
	□3	4.83	4.93
	□2½	4.87	5.08
	□2	5.12	5.24
4	3½	2.50	2.58
	3	3.15	3.21
	□2½	3.29	3.33
	□2	3.11	3.24
	□1½	3.44	3.50
	□1¼	3.54	3.60
	□1	3.59	3.63
3½	3	1.96	1.98
	2½	2.56	2.61
	□2	2.42	2.48
	□1½	2.32	2.38
	□1¼	2.54	2.64
	□1	2.65	2.75
3	2½	1.63	1.66
	2	1.90	1.94
	□1½	1.79	1.83
	□1¼	1.77	1.80
	□1	1.90	1.92
	□ ¾	1.92	1.95
	□ ½	1.93	2.01

• Not stocked
★ Bushings stocked malleable; other sizes cast iron.
□ Inside hex

plugs

square head plugs
cored: fig. 387 ▪

solid: fig. 388

size, in.	weight (approx) each, lb. (cored) fig. 387 black	weight (approx) each, lb. (cored) fig. 387 galvanized	weight (approx) each, lb. (solid) fig. 388 black	weight (approx) each, lb. (solid) fig. 388 galvanized
⅛	.....	.....	.....	.....
¼	.....	.....	.....	.....
⅜	.....	.....	.....	.....
½	.....	.....	.100	.104
¾	.132	.135	.169	.175
1	.250	.281	.320	.333
1¼	.391	.407	.531	.546
1½	.500	.515	.760	.770
2	.815	.833	1.230	1.250
2½	1.320	1.340	2.000	2.080
3	1.870	1.910	3.180	3.310
3½	2.500	2.600•	4.380	•
4	4.000	4.000	.....	.....

bar plugs
cored; fig. 389
solid: fig. 380

countersunk: fig. 390 △

size, in.	cored: fig. 389 wgt (approx) each, lb. black	cored: fig. 389 wgt (approx) each, lb. galv.	solid: fig. 380 wgt (approx) each, lb. black	solid: fig. 380 wgt (approx) each, lb. galv.
4	3.82	3.97	5.68	•
5	6.50	6.83	9.60	•
6	9.94	10.34	14.78	•
8	20.26	21.00	•	•

size, in.	countersunk: fig. 390 wgt (approx) each, lb. black	countersunk: fig. 390 wgt (approx) each, lb. galv.
½	.050	.053
¾	.090	.100
1	.195	.200
1¼	.320	.340
1½	.470	.480
2	.840	1.3
2½	1.400	2.0
3	2.250	3.0
3½	3.020	3.5
4	3.760	7.5

cap

fig. 381

size, in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.
2½	2.55	.....
3	3.60	.....
4	7.05	.....
5	10.70	.....
6	16.00	16.48
8	27.23	28.35

locknut

fig. 370

size, in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.
2½	1.91	1.13
3	2.70	1.60
4	3.50	3.50

floor flange

fig. 1006
bolt holes cored

size, in.	diam. of flange, in.	no. of holes	diam. of holes	weight (approx) each, lb. black	weight (approx) each, lb. galv.	size, in.	diam. of flange, in.	no. of holes	diam. of holes	weight (approx) each, lb. black	weight (approx) each, lb. galv.
¼	2¾	4	¼	.39	.40	1	4	4	¼	1.13	1.14
⅜	3	4	¼	.43	.45	1¼	4	4	¼	1.14	1.15
½	3½	4	¼	.73	.74	1½	4½	4	⅜	1.55	1.56
¾	3½	4	¼	.80	.81	2	5½	4	⅜	2.40	2.43

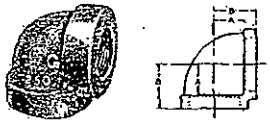
• Not stocked
▪ ⅛, ¼ and ⅜-inch plugs furnished in steel.
△ ½ and ¾-inch countersunk plugs furnished in malleable iron.

cast iron threaded — 250 lb, extra heavy*

pressure ratings, psi { saturated steam: 250 / liquid & gas at 150° F: 400

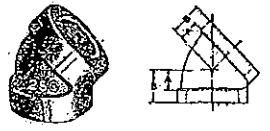
elbows

90° elbow: fig. 421



size, in.	A in.	B in.	weight (approx) each, lb. black
¼	5/8	15/16	.37
3/8	11/16	1 3/16	.50
½	13/16	1¼	.75
¾	15/16	1 5/16	1.13
1	1 1/16	1 7/16	1.79
1¼	1 5/16	1 11/16	3.00
1½	1 1/2	2 1/16	4.05
2	1 13/16	2½	6.76
2½	2	2 13/16	10.56
3	2 3/16	3 3/16	15.25
3½	2 3/4	3 3/4	20.20
4	3 1/16	4 1/16	26.15
5	3 11/16	4 7/16	41.95
6	4 1/16	5 5/16	61.00
8	5 5/16	7	122.00

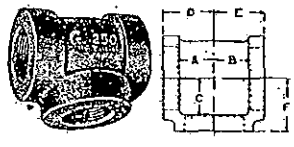
45° elbow: fig. 424



size, in.	A in.	B in.	weight (approx) each, lb. black
½	9/16	1	.66
¾	11/16	1 1/16	1.04
1	13/16	1 5/16	1.56
1¼	15/16	1 1/2	2.70
1½	1 1/16	1 5/8	3.55
2	1 5/16	2	6.07
2½	1 5/8	2 1/2	9.79
3	1 7/8	2 1/2	13.83
3½	1 7/8	2 5/8	•
4	1 3/4	2 13/16	22.60
5	2	3 3/16	•
6	2 1/4	3 1/2	50.20
8	2 15/16	4 5/16	•

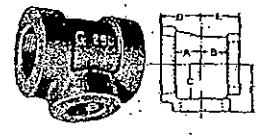
tees

straight tee: fig. 425



size, in.	A, B, C in.	D, E, F in.	weight (approx) each, lb. black
¼	5/8	15/16	.47
3/8	11/16	1 3/16	1.02
½	3/4	1 1/4	1.20
¾	7/8	1 3/8	1.57
1	1	1 1/2	2.43
1¼	1 3/16	1 5/8	3.94
1½	1 3/16	2 1/16	5.31
2	1 3/4	2 1/4	9.01
2½	1 15/16	2 13/16	14.23
3	2 3/16	3 3/16	20.95
3½	2 5/16	3 3/4	26.25
4	2 15/16	4 1/4	33.88
5	3 3/16	4 3/8	54.31
6	4 3/16	5 3/8	79.00
8	5 3/16	7	145.00

reducing tee: fig. 426



size, in.			A in.	B in.	C in.	D in.	E in.	F in.	wgt (approx) each, lb. black
¾	¾	½	¾	¾	⅞	1 3/16	1 1/4	1 3/8	1.37
1	1	¾	⅞	⅞	1	1 1/2	1 1/2	1 5/8	2.19
		½	¾	¾	1	1 7/16	1 3/8	1 1/2	2.03
1¼	1¼	1	1 3/16	1 1/16	1 3/16	1 3/4	1 3/4	1 15/16	3.49
		¾	15/16	15/16	1 1/4	1 5/8	1 5/8	1 3/4	3.21
1½	1½	1¼	1 5/16	1 5/16	1 3/16	2	2	2 1/16	4.98
		1	1 1/16	1 1/16	1 3/16	1 3/4	1 3/4	1 15/16	4.26
		¾	1	1	1 1/4	1 5/8	1 3/4	1 7/8	4.02
2	2	1½	1 1/2	1 1/2	1 5/8	2 3/16	2 3/16	2 3/16	7.69
		1¼	1 3/16	1 3/16	1 5/8	2 1/16	2 1/16	2 1/4	7.11
		1	1 1/16	1 1/16	1 1/2	2	2	2 1/16	6.57
		¾	1	1	1 1/4	1 7/8	1 7/8	2	6.24

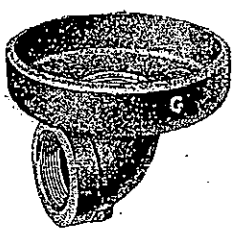
• Not stocked
* For manufacturing standards, see pf-20.

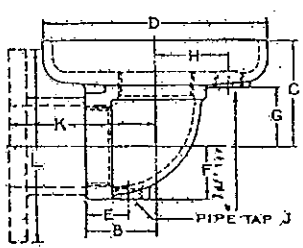
safety valve discharge elbow

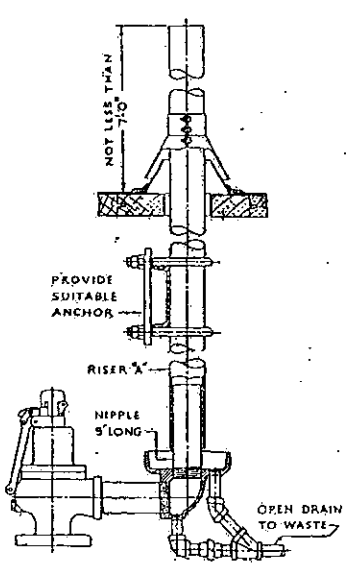
cast iron threaded

threaded inlet
cast iron: fig. 1538
cast steel: fig. 1539

flanged inlet
cast iron: fig. 1538F
cast steel: fig. 1539F







list price, each

elbow pipe size, in.	threaded inlet: iron, fig. 1538	threaded inlet: steel, fig. 1539	flanged inlet○: iron, fig. 1538F	flanged inlet○: steel, fig. 1539F
2½			....	....
3			....	....
3½	Price	Price	....	....
4	on	on	....	....
5	application	application	....	....
6			....	....
8			On application	On application

dimensions

elbow pipe size, in.	riser pipe size, A, in.	B in.	C in.	D in.	E in.	F in.
2½	3½	2 11/16	4 5/16	8½	1 5/8	1 13/16
3	4	3⅛	4⅞	9½	1 5/8	2 5/16
3½	5	3 5/16	5 5/16	10¼	1¾	2⅝
4	5	3¾	5¾	11	1¾	2 15/16
5	6	4½	6¾	12½	1¾	3 5/16
6	8	5⅛	7⅝	13¾	2	4 1/16
8	10	6 7/16	8 7/16	17	2⅜	5⅜

elbow pipe size, in.	riser pipe size, A, in.	G in.	H in.	J in.	K in.	L in.
2½	3½	2¼	2¾	¾	....	....
3	4	2 5/16	3⅛	¾	....	....
3½	5	2⅝	3⅜	¾	....	....
4	5	3 1/16	3¾	¾	....	....
5	6	3 15/16	4⅜	¾	....	....
6	8	4 5/16	5	¾	....	....
8	10	5 15/16	6⅜	1	10¼	13½

weight (lb each)

elbow pipe size, in.	threaded inlet: iron, fig. 1538	threaded inlet: steel, fig. 1539	flanged inlet: iron, fig. 1538F	flanged inlet: steel, fig. 1539F
2½	12.00	14.00	....	....
3	15.00	17.00	....	....
3½	24.00	28.00	....	....
4	27.00	31.00	....	....
5	40.00	44.00	....	....
6	53.00	57.00	....	....
8	104.00	110.00	140.00	148.00

Following are the advantages of Grinnell safety valve discharge elbow, for piping connections to safety valves when attached to boilers, etc.:

Drip pan for removing condensate and rain water cast integral with elbow.

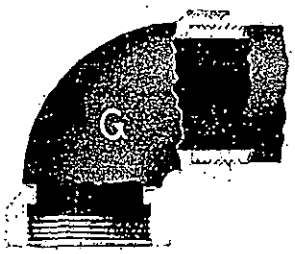
Strains on safety valve minimized.

Pipe tap J is standard.

With multiple pop safety valve, leakage of vapor at any discharge elbow indicates valve in operation.

Steel elbows and flanged elbows furnished on order.

○ Elbows with flanged inlet in sizes smaller than 8-inch can be furnished by using the threaded discharge elbow, pipe nipple and forged carbon steel companion flanges.



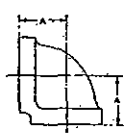
Grinnell drainage fittings have sufficient sweep to give free, unobstructed flow. As shown in the sectional view, they are made with a shoulder of the same diameter as the inside of the pipe. A continuous passage is thereby made when the pipe is screwed up to the shoulder. There is no place for solid matter to collect and clog in the pipe. All Grinnell drainage fittings are recessed and threaded for wrought pipe.

Coated drainage fittings are available in black baked dipped enamel finish and in hot dipped galvanized finish, in all sizes listed. Sizes marked with a • in the weight columns are not stocked, but are made to order. Uncoated or plain drainage fittings are available. Made to order only.

UNPITCHED DRAINAGE FITTINGS—only 90° drainage fittings are normally tapped pitched ¼ inch to the foot, but are not stocked — made to order only. (Note the symbol ◇ indicated beside the figure number for the fittings with the inlet tapped pitched.)

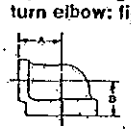
elbows

90° short turn elbow fig. 701◇



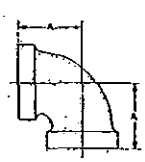
size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	1¾	1.60	1.66
1½	1¾	1.91	1.99
2	2¼	3.04	3.16
2½	2¾	4.75	4.88
3	3¼	7.09	7.17
4	3¾	13.69	13.94
5	4½	20.35	21.38
6	5⅛	32.53	33.83
8	6¾	50.11	52.11
10	8¼	113.28	118.00
12	9¼	164.00	170.00•

90° reducing short turn elbow: fig. 701R◇



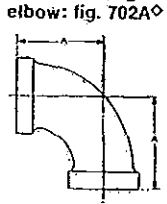
size, in.		A in.	B in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1½	1¼	1⅞	1¾	1.69	1.75
2	1½	2⅛	2	2.49	2.50
2	1¼	2⅛	2	2.50	2.62
4	3	3¾	3⅛	10.20	10.60
5	4	4⅞	3¾	20.00•	20.75•

90° long turn elbow fig. 702◇



size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	2¼	1.74	1.77
1½	2½	2.24	2.32
2	3⅛	3.61	3.76
2½	3¾	5.54	5.77
3	4¼	9.04	9.38
4	5⅜	16.40	17.15
5	6¼	25.25	26.45
6	7⅛	39.50	41.40
8	9	80.00	83.80
10	10¾	140.00	147.00•
12	12¾	222.00•	227.00•

90° extra long turn elbow: fig. 702A◇



1¼	3	1.93	1.95
1½	3½	2.62	2.66
2	4	4.54	4.71
2½	4¾	7.33	7.58
3	5¼	11.59	11.75
4	7	17.81	18.19

• Not stocked
◇ Tapped, pitched ¼ inch to the foot.

elbows, *cont'd*	size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
60° short turn elbow fig. 703	1¼	1¹⁵⁄₁₆	1.72	1.79
	1½	1¾	2.34	2.42
	2	2¹⁄₁₆	3.28	3.33
	2½	2½	4.61	4.73
	3	2⅞	7.66	7.77
	4	3¾	12.42	12.91
	5	3⅞	20.19	20.44
	6	4¼	28.92	29.44
	8	5⅛	60.00	62.00
	10	5¼	90.00•	93.00•
60° long turn elbow fig. 704	1¼	2	2.10•	2.16•
	1½	2¼	2.40	2.50•
	2	2⁹⁄₁₆	3.40	3.50•
	3	3⅛	8.50•	8.75•
	4	4	14.00	14.40•
	5	5⅛	23.50•	24.20•
45° short turn elbow fig. 705	1¼	1⅜	1.38	1.39
	1½	1⅝	1.71	1.75
	2	1¹⁵⁄₁₆	2.79	2.88
	2½	2⅛	4.50	4.75
	3	2⅜	6.31	6.46
	4	2⅝	11.44	11.89
	5	3⅛	17.52	17.88
	6	3⅜	27.58	28.68
	8	4¼	51.88	54.07
	10	5⅛	95.78•	103.97•
	12	5⅜	130.00•	134.00•
45° long turn elbow fig. 706	1¼	1¾	1.67•	1.73•
	1½	1⅞	2.14	2.19
	2	2¼	3.38	3.46
	2½	2⅝	5.13	5.26
	3	2¹⁵⁄₁₆	7.44	7.94
	4	3½	12.75	13.10
	5	4⅛	20.41	21.22
	6	4⅞	31.48	32.74
	8	6	61.00	64.00
	10	7⅛	90.00•	94.00•
	12	8¼	170.00•	175.00•
22½° elbow: fig. 707	1¼	1⅛	1.38•	1.39•
	1½	1¼	1.65	1.70
	2	1⅜	3.08	3.15
	2½	1¾	3.56	3.60
	3	2	5.94	5.98
	4	2⅜	11.13	11.44
	5	2⅝	20.00	21.00
	6	2¹⁵⁄₁₆	24.00	25.00
	8	3⅜	43.00•	45.00•
	10	3¾	63.00•	65.00•

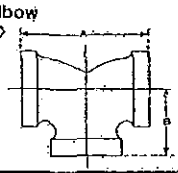
• Not stocked

elbows, *cont'd*

11¼° elbow: fig. 708

size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	1⅜	1.34•	1.40•
1½	1¼	1.81	1.87•
2	1⅜	2.69	2.79•
2½	1⅝	3.44	3.54•
3	1¹⁵⁄₁₆	5.31	5.48•
4	2	9.75	9.88•
5	2¼	19.00	20.00•
6	2⅜	23.00•	24.00•
8	2¾	40.00•	40.50•
10	2¹⁵⁄₁₆	62.00•	64.00•

3-way elbow fig. 710◇



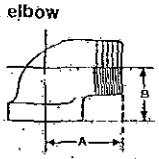
size, in.	A in.	B in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1½	5	2½	3.65	3.69
2	6⅛	3⅛	5.77	5.88

3-way reducing elbow fig. 711◇

(not illustrated)

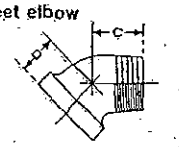
size, in.			A in.	B in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	1¼	1½	4½	2½	3.67	3.83
1½	1½	2	5	3⅛	5.98	6.06

90° street elbow fig. 718◇



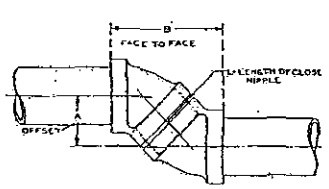
size, in.	A in.	B in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	2½	1⅝	1.58	1.59
1½	3	1⅞	2.05	2.10
2	3¼	2⅛	3.10	3.19

45° street elbow fig. 719



size, in.	C in.	D in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	1⅜	1¼	1.24	1.27
1½	2	1¼	1.64	1.65
2	2¼	1¹¹⁄₁₆	2.67	2.71

shortest offset and face to face obtainable with use of close nipple



pipe size, in.	length close nipple	60° short fig. 703 A in.	60° short fig. 703 B in.	60° long fig. 704 A in.	60° long fig. 704 B in.	45° short fig. 705 A in.	45° short fig. 705 B in.	45° long fig. 706 A in.	45° long fig. 706 B in.
1¼	1⅝	3	4⅛	3¹⁵⁄₁₆	6¼	2¼	4¾	2¾	6¼
1½	1¾	3½	5½	4⅜	6¹⁵⁄₁₆	2⅝	5¼	3	6¾
2	2	4⅛	6½	4⅞	7¹⁵⁄₁₆	2¹³⁄₁₆	6¼	3⅜	8¼
2½	2½	4¹³⁄₁₆	7⅞	5⅛	8⅝	3¼	7⅛	4¾	9½
3	2⅝	5⅝	9	5¾	9¹³⁄₁₆	3¹⁵⁄₁₆	7¹⁵⁄₁₆	4⅝	10½
4	2⅞	6½	10½	7⅜	12¹⁵⁄₁₆	4¼	9½	5½	12½
5	3	7¼	11¹³⁄₁₆	....	....	4¾	10⅞	6¼	14½
6	3⅛	7⅞	13¼	....	....	5⅜	12¾	7⅜	17⅛
8	3½	9¾	16⅜	....	....	6⅜	15	9	....
10	3⅞	....	....	....	....	7¹⁵⁄₁₆	18¾	....	....

pipe size, in.	length close nipple, in.	22½° fig. 707 A in.	22½° fig. 707 B in.	11¼° fig. 708 A in.	11¼° fig. 708 B in.	5⅝° fig. 709 A in.	5⅝° fig. 709 B in.
1¼	1⅝	1	4¼₁₆	½	4⅜₁₆	¼	5⅛₁₆
1½	1¾	1⅛	5¼	⅜	5⅛₁₆	⅜₁₆	5¾
2	2	1⅜	6⅛	⅛	6⅝₁₆	⅜	6⅝
2½	2½	1⅝	7⅜	⅛	7⅛	⅜	7⅛
3	2⅝	1¹³⁄₁₆	8⅜₁₆	¼	7⅞	⅛₁₆	7¹¹⁄₁₆
4	2⅞	2¼₁₆	9⅝₁₆	⅛₁₆	8⅝	⅛₁₆	8¾₁₆
5	3	2¼	10¹³⁄₁₆	1	9½	⅜₁₆	8⅝
6	3⅛	2½	11⅞	1⅛₁₆	10	½	9⅝₁₆
8	3½	3	14⅛₁₆	1¼	11⅝	⅝₁₆	10¾
10	3¾	3⅜	17⅜₁₆	1⅜₁₆	13¼	....	....

• Not stocked
◇ Inlets tapped, pitched ¼ inch to the foot.
Inlets of reducing fittings are always the smallest openings.

tees

size, in.			A in.	B in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
tee: fig. 722◇						
1¼			3½	1¾	2.22•	2.31•
1½			3⅞	1 15/16	2.59	2.69
2			4½	2¼	4.66	4.85
2½			5¼	2 1/16	6.38	6.65
3			6⅛	3 1/16	10.06	10.60
4			7⅞	3 13/16	17.85	18.59
5			9¾	4½	27.25	28.25
6			10¾	5⅛	37.25	38.50
8			13¾	6⅞	79.00•	81.50•
10			15	7½	125.00•	129.00•
12			18	9	275.00•	284.00•
reducing tee fig. 723◇						
1½	1½	1¼	3⅜	1 5/16	2.71•	2.75•
	1¼	1¼	3⅜	1 5/16	2.65•	2.75•
2	2	1½	4⅛	2 5/16	3.77	3.92
	2	1¼	3 3/16	2⅛	3.90•	3.96•
2½	2½	2	4¾	2⅜	6.17	6.41
	2½	1½	4¼	2⅛	4.80•	5.00•
3	3	2	5¼	2⅜	7.91	7.94
	3	1½	5 1/16	2⅛	8.17	8.33
	3	1¼	5 1/16	2⅛	8.17•	8.33•
4	4	3	6⅜	3⅜	14.75	15.69
	4	2	5½	3 1/16	11.58	12.00
	4	1½	5½	3 1/16	11.80	12.20
5	5	4	8⅛	4 1/16	24.00	24.75
	5	3	6 15/16	4½	20.00•	20.60•
	5	2	6 15/16	4½	21.00•	21.65•
6	6	5	10 1/16	5⅛	39.25•	40.50•
	6	4	8⅛	4 13/16	33.00•	34.00•
	6	3	8⅛	4 15/16	34.50•	35.60•
	6	2	8⅛	4 15/16	36.00•	37.10•
8	8	6	11½	6¾	63.00•	65.00•
	8	5	11½	6¾	67.00•	69.00•
	8	4	11½	6¾	74.00•	76.25•
10	10	8	15	7½	130.00•	134.00•
	10	6	11 3/16	7½	90.00•	93.00•
	10	5	11 3/16	7½	93.00•	96.00•
	10	4	11 3/16	7½	96.00•	99.00•
12	12	8	18	9	280.00•	289.00•
basin tee: fig. 724◇ reducing basin tee fig. 724R						
1¼	1¼	1¼	4⅜	2 5/16	2.69	2.79
1½	1½	1½	5⅜	2 11/16	3.98	4.13
2	2	2	7	3½	6.43	6.61
2	2	1½	6⅝	3 1/16	6.00	6.20

crosses

size, in.				A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
basin cross *straight:* **fig. 725◇** *reducing:* **fig. 725R**						
1½	1½	1½	1½	5⅜	5.25	5.50
2	2	2	2	7	9.00	9.30
2	2	1½	1½	6⅝	8.00	8.25

• Not stocked
◇ Inlets tapped, pitched ¼ inch to the foot.

Y-branches

size, in.			A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
90° short turn Y-branch tee pattern fig. 726◇							
	1¼		3¼	2¼	2¼	2.47	2.52
	1½		4¼	2½	2½	3.09	3.18
	2		5⅜	3⅜	3⅜	5.08	5.15
	2½		6⅜	3⅛	3⅛	9.13	9.25
	3		7¼	4¼	4¼	11.77	12.32
	4		8¾	5⅜	5⅜	21.25	21.42
	5		10⅜	6⅛	6⅛	32.25	33.81
	6		11⅝	7⅛	7⅛	51.55	52.50
	8		15⅜	9	9	98.00	101.00
	10		19⅜	12⅜	12¼	146.50•	151.00•
90° reducing short turn Y-branch tee pattern fig. 727◇							
1½	1½	1¼	3⅜	2½	2⅜	2.97	3.06
	1¼	1½	4½	2½	2½	3.18	3.28
	1¼	1¼	3⅜	2½	2⅜	3.01	3.21
2	2	1½	4⅝	2⅝	2⅛	4.16	4.30
	2	1¼	4⅜	2⅜	2⅛	4.47	4.65
	1½	2	5⅜	3⅜	3⅜	4.80	5.00
	1½	1¼	4⅝	2⅝	2⅛	4.33	4.46
2½	2½	2	5½	3⅝	3¼	6.24	6.50
	2½	1½	4⅞	3⅛	2⅜	5.75•	5.88•
	2½	1¼	4⅜	2⅝	2½	5.75•	6.00•
3	3	2½	7¼	4¼	4¼	12.50	13.00
	3	2	5⅛	3⅜	3⅜	9.33	9.50
	3	1½	5⅛	3⅜	2⅜	7.78	8.04
	3	1¼	5⅛	3⅜	2⅜	8.00	8.25
4	4	3	7⅞	4¾	4⅝	16.57	17.24
	4	2½	6⅝	4⅛	3⅛	14.25	14.75
	4	2	5⅜	4⅛	3⅜	13.44	13.50
	4	1½	5¼	3⅛	3	12.56	12.68
5	5	4	9⅛	5⅛	5⅛	32.81	34.12
	5	3	7⅞	5¼	4½	23.00	24.00
	5	2	6⅞	4⅝	3⅛	18.00	18.50
6	6	5	10⅜	6⅝	6¼	42.97	44.70
	6	4	9¼	6⅛	5⅜	29.45	30.67
	6	3	7⅞	5¾	4⅝	31.00	32.00
	6	2	6¼	5⅛	3⅛	25.60	26.40
	6	1½	6¼	5⅛	3⅛	26.00•	26.80•
8	8	6	15⅜	8½	10	72.75	75.00
	8	5	12⅞	8½	8⅜	75.20•	77.50•
	8	4	11⅛	7⅝	7⅝	68.30	70.40
	8	3	11⅛	7⅝	7⅛	71.75•	74.00•
10	10	8	17⅝	11⅛	11¼	116.50•	120.00
	10	6	13⅞	9⅝	8⅛	100.00•	103.00•
	10	4	13⅞	9⅝	8⅛	106.00•	109.00•

• Not stocked
◇ Inlets tapped, pitched ¼ inch to the foot.

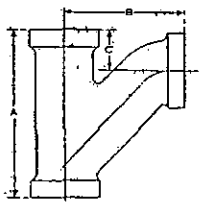
Y-branches, *cont'd*

size, in.		A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.
90° double short turn Y-branch tee pattern fig. 728◇						
1¼		3¼	4½	2¼	3.18•	3.26•
1½		4¼	5	2½	4.54	4.64
2		5⅛	6⅛	3⅛	6.08	6.28
2½		6⅞	7 15/16	4	11.80•	12.50•
3		7¼	8½	4¼	15.53	15.75
4		8¾	10⅜	5⅛	26.38	26.94
5		10⅛	12¼	6⅛	42.00•	43.50•
6		11 15/16	14¼	7⅛	56.00•	58.00•
8		15¼	18⅜	9⅛	114.00•	118.00•
90° reducing double short turn Y-branch tee pattern fig. 729◇						
1½	1¼	3⅞	5	2¼	3.83	3.95
2	1½	4⅜	5⅞	2 11/16	5.82	6.06
	1¼	4⅜	5¾	2 11/16	6.14	6.40
2½	2	5½	6⅝	3¼	7.60•	8.00•
	1½	4⅞	6⅛	2 13/16	6.88•	7.00•
3	2	5 11/16	7¼	3⅝	10.56•	10.96•
	1½	5⅛	6⅝	2 13/16	8.53•	8.60•
4	3	7⅜	9½	4⅝	19.40•	20.00•
	2	5 13/16	8⅛	3⅜	13.50•	13.94•
	1½	5¼	7⅜	3	11.94•	12.41•
5	4	9⅛	11⅞	5⅜	30.60•	31.20•
	3	7¼	10½	4½	25.00•	25.75•
	2	6⅛	9¼	3⅝	19.00•	20.00•
6	5	10⅝	13¼	6¼	45.00•	46.50•
	4	9¼	12⅜	5⅜	43.00•	44.30•
	3	7⅞	11½	4⅝	39.00•	40.20•
	2	7⅞	11½	4⅝	41.00•	42.20•
8	6	15¼	18⅜	9⅛	118.50•	123.00•
	5	15¼	18⅜	9⅛	120.50•	125.00•
	4	11 15/16	15¼	7⅝	77.00•	79.50•
	3	11 15/16	15¼	7⅝	80.00•	82.50•
90° double short turn TY with hub top fig. 771						
1½		6⅞	2½	2½	5.62	5.75
2		7⅞	3 1/16	3 1/16	8.75	9.25
90° reducing double short turn TY with hub top fig. 771R (not illustrated)						
1½	1¼	6¾	2½	2⅜	5.00	5.40

• Not stocked
◇ Inlets tapped, pitched ¼ inch to the foot.

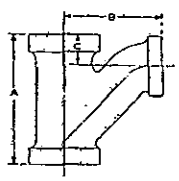
Y-branches, *cont'd*

90° long turn Y-branch tee pattern: fig. 730◇



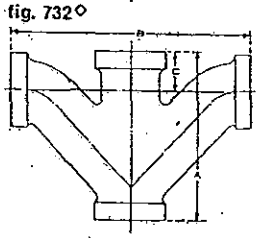
size, in.	A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	4¾	3⅝	1⅛	2.93	3.06
1½	5⅜	4⅛	1¼	4.43	4.60
2	7	5¼	1¾	6.69	6.74
2½	8¼	6¼	2	11.81	12.48
3	9⅞	7½	2⅜	16.27	16.92
4	13	9⅞	3⅛	33.14	34.26
5	15¾	12¼	3½	58.00	59.50
6	18¾	14⅝	4⅛	92.00	95.00
8	24⅛	19	5½	198.00	204.00
10	22⅛	16⅛	7¼	213.00•	220.00•
12	26⅛	19	7	340.00•	350.00•

90° reducing long turn Y-branch tee pattern fig. 731◇



size, in.			A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1½	1½	1¼	5⅜	3⅞	1⅜	3.46	3.65
2	2	1½	5¾	4⅜	1⅝	5.23	5.31
	2	1¼	5¾	4⅜	1⅝	5.13	5.26
	1½	2	7	5¼	1¾	6.90	7.24
	1½	1½	5¾	4⅜	1⅝	5.40	5.50
2½	2½	2	7⅜	5¾	1⅝	9.91	10.14
	2½	1½	5¾	4⅜	1⅝	7.00	7.25
3	3	2½	9⅛	7½	2⅜	16.83	17.46
	3	2	7⅞	6¼	1⅝	12.06	12.25
	3	1½	5⅝	5	1⅝	9.58	9.71
4	4	3	10	8⅛	2⅛	25.13	25.75
	4	2½	8⅜	7¼	1⅞	20.50	21.00
	4	2	7⅛	6¼	1⅝	16.50	17.16
	4	1½	6⅛	5⅛	1⅝	13.78	14.50
5	5	4	13	10⅛	2⅛	41.00	42.30
	5	3	10½	8⅜	2⅛	28.50	29.50
	5	2	7¾	7¼	1⅝	29.00	30.00
	5	1½	7¾	7¼	1⅝	30.00•	31.00•
6	6	5	16⅛	12⅞	3½	75.00	77.25
	6	4	13⅛	11	2⅞	53.00	54.60
	6	3	10⅜	9⅛	2⅜	40.00	41.25
	6	2	10⅜	9⅛	2⅜	42.00•	43.25•
8	8	6	19¼	15⅝	4⅛	139.00	143.25
	8	4	10⅜	10	3¼	120.00•	123.60•
	8	3	10⅜	10	3¼	124.00•	128.00•
10	10	6	20¼	17¼	4⅜	170.00•	175.00•
12	12	8	26⅛	19	7	350.00•	360.00•

90° double long turn Y-branch tee pattern fig. 732◇

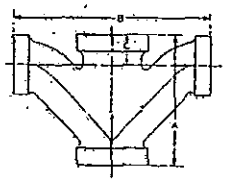


size, in.	A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	4¾	7¼	1⅛	3.99•	4.13•
1½	5⅜	8¼	1¼	6.93	7.07
2	7	10½	1¾	9.36	9.50
2½	8¼	12½	2	15.00	15.50
3	9⅞	15	2⅜	23.35	24.54
4	13	19¾	3⅛	45.25	45.63
5	12⅝	20⅛	3½	72.50	74.75
6	14½	21⅜	4⅛	105.00•	108.00•
8	17⅞	26⅛	5⅛	230.00•	237.00•

• Not stocked
◇ Inlets tapped, pitched ¼ inch to the foot.

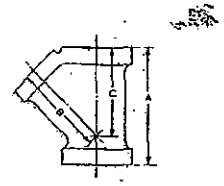
Y-branches, *cont'd*

90° reducing double long turn Y-branch tee pattern fig. 733◇



size, in.		A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1½	1¼	5⅛	7¾	1¾₁₆	4.75	4.81
2	1½	5¼	8¼	1⅝	7.40	7.71
	1¼	5⅜	8¼	1⅝	7.63•	7.79•
2½	2	7⅜	11½	1⅝	10.00•	11.12•
3	2	7¾₁₆	12⅛	1¾	13.90	14.45
	1½	5¹⁵⁄₁₆	9¹⁵⁄₁₆	1⅝	13.00•	13.50•
4	3	13	19¾	3¼	47.00•	48.50•
	2	7¹¹⁄₁₆	13¼	1⅝	19.00•	19.60•
	1½	6¼	10⅞	1⅜	15.00•	15.50•
5	4	11⅛	18¾	3¼	50.00•	51.50•
	3	11⅛	18¾	3⅛	52.00•	53.50•
	2	7¾	13¼	2	36.00•	37.00•
6	5	16⅛	25⅜	3½	73.00•	76.00•
	4	13⅛	22	2⅞	61.50•	63.50•
	3	8¹⁵⁄₁₆	14⅝	2¾	50.00•	51.50•
	2	8¹⁵⁄₁₆	14⅝	2¾	52.00•	53.50•
8	6	14¹¹⁄₁₆	22⅛	5¹³⁄₁₆	160.00•	165.00•
	4	14¹¹⁄₁₆	22⅛	5¹³⁄₁₆	164.00•	169.00•
	3	14¹¹⁄₁₆	22⅛	5¹³⁄₁₆	166.00•	171.00•
10	6	16⅝	28½	4¹⁵⁄₁₆	194.00•	200.00•

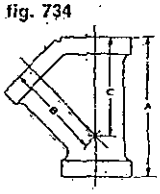
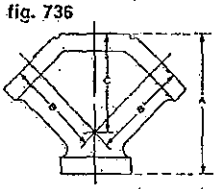
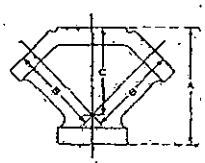
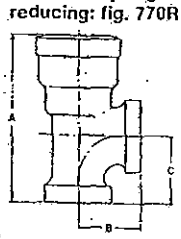
45° reducing Y-branch fig. 735▲



size, in.			A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1½	1½	1¼	5¼	3⅜	3½	3.21	3.33
2	2	1½	5⅜	4⅛	4⅛	4.83	4.94
	2	1¼	5⅜	3¹³⁄₁₆	3¾	4.77	5.06
	1½	2	6½	4¾	4¾	5.00	5.15
	1¼	1½	5⅜	4¼	4¼	4.94	5.06
2½	2½	2	7⅛	5¼	4¹³⁄₁₆	8.03	8.38
		1½	6⅝	4⅝	4⅝	7.49	7.58
3	3	2½	8	5¹³⁄₁₆	5¼	12.38	12.87
		2	7⅜	5¼	5⅛	10.06	10.56
		1½	6⅜	5⅛	4¹³⁄₁₆	8.73	9.10
4	4	3	9½	7⅞	6⅞	20.63	21.83
	4	2½	8¼	6⅞	6	17.00	17.50
	4	2	7¹³⁄₁₆	6⅞	6	16.33	16.63
	4	1½	7⅜	6⅛	5¾	14.91	15.72
5	5	4	11⅜	8½	8¼	36.17	36.58
	5	3	9¹⁵⁄₁₆	7⅞	7¾	25.75	26.50
	5	2	8¼	7⅛	6⅞	22.25	23.00
6	6	5	13	10	9¹³⁄₁₆	46.75	47.00
	6	4	11⅞	9⅜	9⅛	45.05	46.50
	6	3	10	8¾	8⅝	39.00	41.00
	6	2	8⅝	8⅛	7⅞	30.00	31.00
8	8	6	14¹⁵⁄₁₆	12⅜	11⅜	92.50	94.67
	8	5	11¾	10¹³⁄₁₆	10⅜	70.00	72.00
	8	4	11⅞	11	10⅜	65.28	68.00
	8	3	11⅞	11	10⅞	70.00	72.00
10	10	8	23	16½	16½	251.00•	259.00•
	10	6	16	13¾	12⅝	149.00•	153.50•
	10	4	16	13¾	12⅝	151.00•	155.50•
	10	4	11¹³⁄₁₆	12¹³⁄₁₆	11¹³⁄₁₆	115.00•	118.50•
12	12	10	26¼	19⅜	19⅜	380.00•	391.00•
	12	8	26¼	19⅜	19⅜	390.00•	401.00•
	12	6	15	14¹³⁄₁₆	13⅜	196.00•	202.00•
	12	5	15	14¼	12¹⁵⁄₃₂	188.00•	194.00•
	12	4	15	13³⁵⁄₃₂	11¹³⁄₁₆	175.00•	180.00•

• Not stocked
▲ Inlet is smallest opening.
◇ Inlets tapped, pitched ¼ inch to the foot.

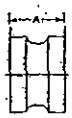
Y-branches, *cont'd*

	size, in.		A in.	B in.	C in.	weight (approx) each, lb. black	weight (approx) each, lb. galv.
45° Y-branch fig. 734 	1¼		5	3¼	3¼	2.71	2.83
	1½		5½	3⅜	3⅜	4.03	4.11
	2		6½	4⅜	4⅜	5.56	5.71
	2½		7⅞	5⅜	5⅜	9.08	9.19
	3		9	6⅜	6⅜	12.00	13.06
	4		10⅞	7 11/16	7 11/16	24.51	24.78
	5		12 13/16	9⅜	9⅜	46.77	47.80
	6		14 13/32	10¾	10¾	63.00	65.00
	8		18 13/16	13⅜	13⅜	129.00	134.00
	10		23	16½	16½	228.00•	246.00•
	12		26¼	19 1/16	19 1/16	370.00•	381.00•
45° double Y-branch fig. 736 	1¼		5	3¼	3¼	3.77•	3.88•
	1½		5½	3⅜	3⅜	5.09	5.23
	2		6½	4¼	4⅜	6.75	7.00
	2½		7⅞	5⅜	5⅜	11.38	11.58
	3		9	6⅜	6⅜	17.28	17.63
	4		10⅞	7½	7 11/16	31.50	33.25
	5		12 13/16	9⅜	9⅜	56.00	57.75
	6		14⅜	10¾	10¾	70.00•	72.00•
	8		18 13/16	13⅜	13⅜	150.00•	154.50•
	10		20¼	15⅜	15⅜	260.00•	268.00•
45° reducing double Y-branch: fig. 737▲ 	2	1½	5⅞	4⅛	4⅛	6.46	6.58
		1¼	5⅝	3 15/16	3¾	5.30•	5.50•
	2½	2	7 1/16	5⅛	4 15/16	9.00•	9.25•
		1½	7 1/16	5⅛	4 15/16	9.50•	9.75•
	3	2½	8	5 5/16	5 1/16	15.50•	16.00•
		2	7⅜	5⅛	5⅛	12.50	12.71
		1½	7¾	5⅛	5⅛	13.00•	13.30•
	4	3	9¼	7 5/16	6⅛	23.50	24.75
		2	7 11/16	6⅛	6⅛	20.00	20.60
		1½	7 5/16	6 1/16	5¾	18.50•	19.00•
	5	4	11⅜	8 3/32	8 1/32	38.00	39.00
		3	9 13/16	7⅛	7⅛	30.00•	31.00•
		2	8¼	7 1/16	6⅛	26.00•	26.80•
	6	5	13	10	9 15/16	57.00•	59.00•
		4	11⅜	9⅛	9⅛	46.00	47.50
		3	10	8¼	8¼	43.00•	44.30•
		2	8 7/16	8 1/16	7¼	34.00•	35.00•
	8	6	14 15/16	12¼	11¼	110.00•	113.50•
		5	14 15/16	12¼	11⅛	115.00•	118.50•
		4	10⅝	10⅛	9⅛	75.00•	77.50•
		3	10⅝	10⅛	9¼	79.00•	82.00•
	10	8	20¼	15⅜	15⅜	280.00•	290.00•
		6	20¼	15⅜	15⅜	297.00•	307.00•
		5	20¼	15⅜	15⅜	305.00•	315.00•
		4	20¼	15⅜	15⅜	312.00•	322.00•
short turn TY with hub top: fig. 770◇ reducing: fig. 770R 	1¼		6 1/16	2¼	2¼	3.30	3.50
	1½		6⅛	2½	2½	4.70	4.90
	1½ x 1¼		6¼	2½	2⅜	4.20	4.40
	2		7⅝	3 1/16	3 1/16	7.90	8.20

• Not stocked
◇ Tapped, pitched ¼ inch to the foot.
▲ Inlet is smallest opening.

coupling

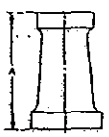
fig. 753



size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	3	1.38	1.41
1½	3⅜	1.75	1.84
2	3¾	2.75	2.81
2½	4	4.56	4.67
3	4¼	6.42	6.58
4	4½	9.78	9.85
5	4¾	15.69	16.25
6	5	21.69	22.12
8	5⅝	39.25	40.75
10	6¼	64.00•	66.00•
12	7	100.00•	103.00•

increaser

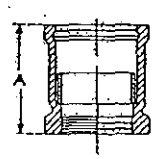
fig. 742



size, in.		A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
2	1¼	9	4.58	4.66
2½	2	9	6.50	7.00
3	2½	9	8.60	9.00
	2	9	7.71	7.88
4	3	9	12.94	13.19
	2	9	11.35	11.49
5	4	9	19.81	20.60
	3	9	15.00•	15.45•
	2	9	14.00•	14.40•
6	5	9	25.44	26.50
	4	9	23.19	24.09
	3	9	25.30•	26.50•
	2	9	21.30•	22.00•
8	6	9	40.00	42.00
	5	9	42.00•	44.00•
	4	9⅛	32.30•	33.30•
10	8	9	71.75	74.00
	6	9	63.00	65.00
12	10	9	100.00•	103.00•
	6	9	110.00•	113.50•

connection

tucker connection
fig. 744+



size, in.	A in.	weight (approx) each, lb. black	weight (approx) each, lb. galvanized
1¼	3¾	2.75	3.00
1½	4	4.04	4.15
2	4¾	5.40	5.62
2½	4¹⁵⁄₁₆	7.00	7.38
3	4¾	9.33	9.71
4	6¹⁵⁄₁₆	20.00	20.50
5	7	26.19	26.69
6	7⅞	34.00	35.00
8	8¹⁵⁄₁₆	75.00	76.00
10	9⅞	112.00•	115.50•
12	9¾	210.00•	216.00•

• Not stocked
+ Sizes 4 thru 12 inch only furnished with loose ring.

traps

size, in.	A in.	B in.	C in.	vent in.	clean-out in.	water seal, in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
double vent running trap: fig. 751 ↓✣								
1¼	7¾	3⅛	2	1¼	2	¾	5.46•	5.52•
1½	8⅜	3⅜	2¼	1½	2	1	7.09	7.33
2	10⅛	4	2⅝	2	2	1	10.66	11.08
3	13¾	5⅜	3½	3	2½	1¼	26.56	27.00
4	17¼	7	4⅜	4	2½	2	45.35	47.17
5	20½	8⅜	4¾	4	2⅝	2	82.00•	84.00•
6	23⅝	10¼	5⅝	4	4⅛	2	127.00•	129.00•
8	30⅝	12⅞	6⅞	6	3⅛	3	222.00•	225.00•
10	35	14⅝	7⅜	6	4¼	3	320.00•	330.00•
12	39⅜	16⅞	8⅝	6	4⅛	3	507.00•	522.00•
P-trap: fig. 752 ↓⊛								
1¼	1⅝	2	¾	...	¾	2	3.57	3.71
1½	2⅛	2¼	⅞	...	1	2	4.49	4.69
2	2⅝	2¾	¾	...	1	2	7.18	7.31
3	3⅛	3¾	1⅜	...	1¼	2½	16.87	17.52
4	4¼	5	1½	...	2	2½	30.57	31.87
5, 6, 8	Use half S-trap, fig. 748 and plug vent							

bath P-trap: fig. 754⊛ size, in.	A in.	B in.	C in.	D in.	water seal, in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
1½	2⅛	2⅜	4⅜	4⅜	2	3.87	4.06
2	2½	2⅝	5⅜	5⅜	2	6.25	6.46

adjustable P-trap fig. 755⊛ size, in.	A in.	B in.	C in.	wgt (approx) each, lb. black	wgt (approx) each, lb. galv.
Trap complete: 1½	1⅜	3	3⅜	5.15	5.28•
Trap only: 1½	...	3	...	2.99	3.25

• Not stocked
↓ Cleanout plug not included.

⊛ Outlets tapped, pitched ¼ inch to the foot.
✣ Inlets and outlets tapped, pitched ¼ inch to the foot.

cast iron flanged — 125 lb, standard

pressure ratings, psi { saturated steam: 1 to 12 inch: 125; 14 to 24 inch: 100 / liquid & gas at 150° F: 1 to 12 inch: 175

specifications

All Standard or "Class 125" Cast Iron Flanged Fittings in sizes listed are made to American National Standard ANSI B16.1 and are marked G-125 for pipe sizes 12-inch and smaller; G-100 for pipe sizes 14-inch and larger; and have plain faces. Unless otherwise specified, they are shipped with flanges faced and drilled American National Standard. Dimensions conform to federal specification: WW-F-406a. Material specification to ASTM A 126 Class B.

Grinnell fittings in this section, up to 16-inch inclusive, are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

sizes

Size of all fittings scheduled indicates nominal inside diameter of ports.

Standard reducing elbows carry the same dimensions center-to-face as regular elbows of largest straight size.

All tees, crosses and laterals reducing on the run only have the same center-to-face and face-to-face dimensions as a straight fitting of the size of the largest opening. Sizes 16" and smaller reducing on the outlet have same dimensions as a straight fitting of the size of the largest opening.

Sizes 18", 20" and 24" reducing on the outlet in the following sizes are to short body pattern and are to the dimensions shown as follows:

Reducing Tees and Reducing Crosses

Nominal Pipe Size	Size of Outlet and Smaller	Center to Face Run	Center to Face Outlet or Side Outlet
18"	12"	13"	15½"
20"	14"	14"	17"
24"	16"	15"	19"

Reducing Laterals

Nominal Pipe Size	Size of Outlet and Smaller	Center to Face Run	Center to Face Run	Center to Face Branch
18"	8"	25"	1"	27½"
20"	10"	27"	1"	29½"
24"	12"	31½"	½"	34½"

All Reducing Fittings in the sizes 18", 20" and 24" can also be supplied to Straight Size dimensions if specified. Prices on application.

To order reducing companion flanges, specify threaded or reduced size first, then the outside diameter of flange wanted. For instance, if a reducing flange is required to connect a 5-inch pipe to an 8-inch flanged valve or fitting having a 13½-inch o.d. flange, order: 5 x 13½-inch standard reducing flange.

dimensions

Bolt holes, for bolts smaller than 1¼ inches in diameter are drilled ⅛ inch larger than bolt diameter; for bolts 1¼ inch and larger, bolt holes are ¼ inch larger than bolt diameter. Bolt holes straddle the center line. Bolt holes are spot faced on order only.

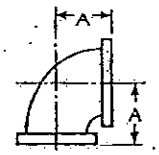
tolerances

An inspection limit of plus or minus ⅛ inch shall be allowed on all center to contact surface dimensions for sizes up to and including 10 inches; plus or minus ¼ inch on sizes larger than 10 inches. Inspection limit of plus or minus ¼ inch shall be allowed on all contact surface to contact surface dimensions for sizes up to and including 10 inches; plus or minus ½ inch on sizes larger than 10 inches. The largest opening in the fitting governs the tolerance to be applied to all openings.

* It is recognized that some variations are unavoidable in the making of patterns and castings. Equipment shall be designed to produce wall thicknesses shown. Wall thickness at no point shall be less than 87½ per cent of the thickness given in tables.

elbows

90° straight elbow
fig. 801

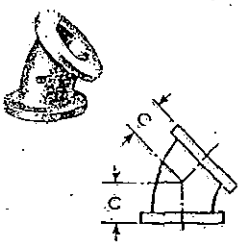


A: center to face

size, in.	A in.	diameter of flange, in.	thickness of flange (min) in.	wall thickness* in.	wgt (approx) each, lb.
1¼	4	5	7/16	5/16	9
2	4½	6	5/8	5/16	14
2½	5	7	11/16	5/16	19
3	5½	7½	3/4	3/8	24
3½	6	8½	13/16	7/16	31
4	6½	9	15/16	½	41
5	7½	10	15/16	½	52
6	8	11	1	5/8	68
8	9	13½	1⅛	⅝	110
10	11	16	1¼	¾	175
12	12	19	1¼	13/16	250
14 O.D.	14	21	1⅜	⅞	350
16 O.D.	15	23½	1⅜	1	470
18 O.D.	16½	25	1⅜	1⅛	580

elbows, *cont'd*

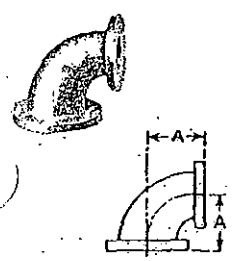
45° straight elbow
fig. 802



C: center to face

size, in.	C in.	diameter of flange, in.	thickness of flange (min) in.	wall thickness* in.	weight (approx) each, lb.
1½	2¼	5	9/16	5/16	8
2	2½	6	5/8	5/16	12
2½	3	7	11/16	5/16	17
3	3	7½	3/4	3/8	20
3½	3½	8½	13/16	7/16	27
4	4	9	15/16	1/2	36
5	4½	10	15/16	1/2	45
6	5	11	1	5/8	60
8	5½	13½	1 1/8	3/4	94
10	6½	16	1 3/16	3/4	145
12	7½	19	1 1/4	13/16	220
14 O.D.	7½	21	1 3/8	7/8	270
16 O.D.	8	23½	1 7/16	1	360
18 O.D.	8½	25	1 5/8	1 1/16	420

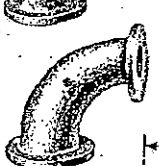
taper reducing elbow
fig. 803

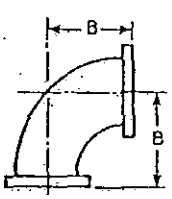


A: center to face

size, in.		A in.	weight (approx) each, lb.	size, in.		A in.	weight (approx) each, lb.
2	1½	4½	12	8	6	9	90
2½	2	5	18		5		82
3	2½	5½	22		4		77
	2		19	10	8	11	150
4	3	6½	33		6		125
	2½		31	12	10	12	220
	2		29		8		190
5	4	7½	48		6		165
	3		40				
6	5	8	60	14	12	14	320
	4		56	16	12	15	380•
	3		47				

long radius elbow
straight: fig. 804
reducing: fig. 804R





B: center to face

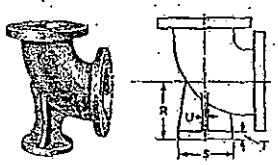
size, in.	B in.	diameter of flange, in.	thickness of flange (min) in.	wall thickness* in.	weight (approx) each lb.
2	6½	6	5/8	5/16	16
2½	7	7	11/16	5/16	23
3	7¾	7½	3/4	3/8	28
4	9	9	15/16	1/2	48
5	10¼	10	15/16	1/2	62
6	11½	11	1	5/16	85
8	14	13½	1 1/8	3/8	145
10	16½	16	1 3/16	3/4	230
12	19	19	1 1/4	13/16	350
14 O.D.	21½	21	1 3/8	7/8	470
16 O.D.	24	23½	1 7/16	1	670

reducing size, in.		B in.	weight (approx) each lb.	reducing size, in.		B in.	weight (approx) each, lb.
3	2½	7¾	26	8	6	14	130
	2		23		5		118
4	3	9	46	10	8	16½	205
5	4	10¼	58				
6	5	11½	81	12	10	19	320
	4		78				

• Not stocked * See notes page pf-47.

elbows, *cont'd*

base elbow; fig. 805



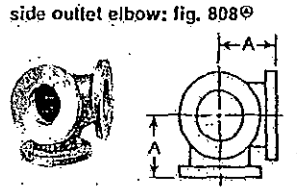
size, in.	center to base R in.	diameter of round base, S in.	thickness of base T in.	thickness of ribs U in.	size of supporting pipe for base, in.	weight (approx) each, lb.
4	5½	6	5/8	½	2	59
5	6¼	7	11/16	5/8	2½	76
6	7	7	11/16	5/8	2½	110
8	8¾	9	15/16	¾	4	158
10	9¾	9	15/16	⅞	4	224
12	11¼	11	1	1	6	324

Bases, when drilled, should be drilled to the template of the flange of the supporting pipe size.

Size of base determined by size of largest opening of fitting.

Bases will be furnished not faced and not drilled unless otherwise specified. When ordered faced, dimensions "R" and "T" will be slightly less than shown in table.

side outlet elbow; fig. 808⊙

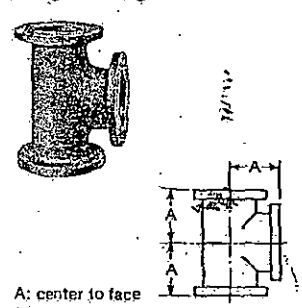


A: center to face

size, in.	A in.	diameter of flange, in.	thickness of flange, in.	wall thickness in. ▪	weight (approx) each, lb.
4	6½	9	15/16	½	59
5	7½	10	15/16	½	74
6	8	11	1	5/8	96
8	9	13½	1⅛	⅝	150
10	11	16	1⅜	¾	240
12	12	19	1½	15/16	340

tees

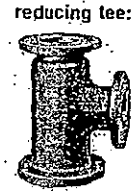
straight tee; fig. 811



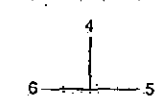
A: center to face
AA: face to face

size, in.	A in.	AA in.	diameter of flange, in.	thickness of flange (min.), in.	wall thickness in. ▪	weight (approx) each, lb.
1¼	4	8	5	5/8	5/8	15
2	4½	9	6	¾	5/8	21
2½	5	10	7	15/16	5/8	30
3	5½	11	7½	¾	¾	37
3½	6	12	8½	15/16	¾	49
4	6½	13	9	15/16	½	64
5	7½	15	10	15/16	½	81
6	8	16	11	1	5/8	105
8	9	18	13½	1⅛	⅞	165
10	11	22	16	1⅜	¾	270
12	12	24	19	1¼	15/16	380
14 O.D.	14	28	21	1⅜	1	530
16 O.D.	15	30	23½	1⅜	1	700
18 O.D.	16½	33	25	1⅜	1⅛	860

reducing tee; fig. 812



In describing tees, the run is first named, then the outlet, thus:



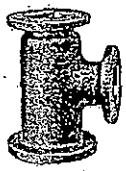
Dimensions for reducing tees for sizes listed 16" and smaller have same center to face dimension as straight size fittings corresponding to the largest opening. Dimensions of sizes not listed furnished on request.

size, in.			weight (approx) each, lb.	size, in.			weight (approx) each, lb.
2	2	1½	19	5	5	4	80
2½	2½	2	28			3	71
3	3	2½	35			2½	66
		2	34			2	64
		1½	32	4	4	5	71
2½	2½	3	34	6	6	5	105
4	4	3	57			4	97
		2½	56			3	92
		2	51		5	4	91
		1½	50		4	6	94
	2½	4	56			4	88
		3	51			3	86
		2½	49		3	6	91
	2	4	50			4	85
3	3	4	56			3	80
					2	6	83

⊙ On side outlet elbows the side outlet is always on the intersecting center lines.
▪ See notes page pf-47.

tees, *cont'd*

reducing tee: fig. 812

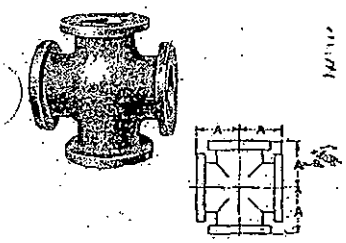


Dimensions for reducing tees for sizes listed 16" and smaller have same center to face dimension as straight size fittings corresponding to the largest opening. Dimensions of sizes not listed furnished on request.

size, in.			weight (approx) each, lb.	size, in.			weight (approx) each, lb.
5	5	6	102	10	10	8	262
4	4		88			6	240
8	8	6	156		6	6	
		4	143	12	12	10	362
		8	159			8	330
	6	6	144			6	323
		5	130			5	295
		4	125			4	291
		3	123		10	12	365
	5	8	149			10	340
						8	320
	4	8	146			6	310
		6	140		8	12	340
						8	298
6	6	8	142	10	10	12	340
				14	14	6	446

cross

fig. 821

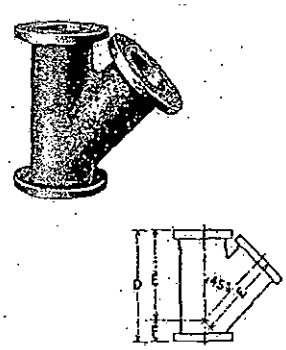


A: center to face
AA: face to face

size, in.	A in.	AA in.	diameter of flange, in.	thickness of flange (min), in.	wall thickness in. *	weight (approx) each, lb.
2	4½	9	6	5/8	5/16	28
2½	5	10	7	11/16	5/16	39
3	5½	11	7½	3/4	3/8	48
4	6½	13	9	15/16	1/2	82
5	7½	15	10	15/16	1/2	105
6	8	16	11	1	5/16	135
8	9	18	13½	1 1/8	3/8	210
10	11	22	16	1 1/4	3/4	330
12	12	24	19	1 1/4	13/16	470

lateral

fig. 823

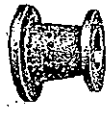


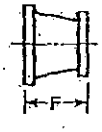
size, in.	face to face, D, in.	center to face, E, in.	center to face, F, in.	diameter of flange, in.	thick. of flange (min), in.	wall thickness in. *	weight (approx) each, lb.
2	10½	8	2½	6	5/8	5/16	25
2½	12	9½	2½	7	11/16	3/16	36
3	13	10	3	7½	3/4	3/8	44
4	15	12	3	9	15/16	1/2	75
5	17	13½	3½	10	15/16	1/2	96
6	18	14½	3½	11	1	5/16	125
8	22	17½	4½	13½	1 1/8	3/8	210
10	25½	20½	5	16	1 3/16	3/4	340
12	30	24½	5½	19	1 1/4	13/16	520

* See notes page pf-47.

reducers

concentric reducer
fig. 825

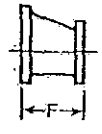




F: face to face

size, in.		F in.	weight (approx) each, lb.	size, in.		F in.	weight (approx) each, lb.
2	1½	5½	12	8	6	11	77
2½	2	5½	14		5		71
	1½	5½	12		4		66
3	2½	6	19	10	8	12	120
	2		16		6		100
	1½		14		5		90
3½	3	6½	24		4		85
4	3½	7	31	12	10	14	180
	3		28		8		155
	2½		26		6		140
	2		24				
5	4	8	39	14	12	16	250
	3		32		10		220
	2½		31		8		200
6	5	9	50		6		185
	4		47	16	14	18	340
	3		39		12		310
	2½		37		10		280
	2		34				

eccentric reducer
fig. 826



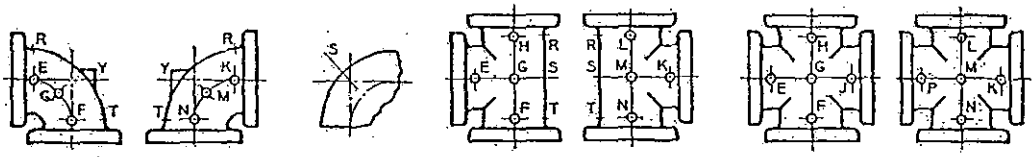
F: face to face

size, in.		F in.	weight (approx) each, lb.
3	2½	6	22
	2		16
4	3	7	28
	2½		28
	2		28
5	4	8	39
6	5	9	51
	4		50
	3		47
8	6	11	77
	5		76
	4		71
10	8	12	120
	6		107
12	10	14	180
	8		155

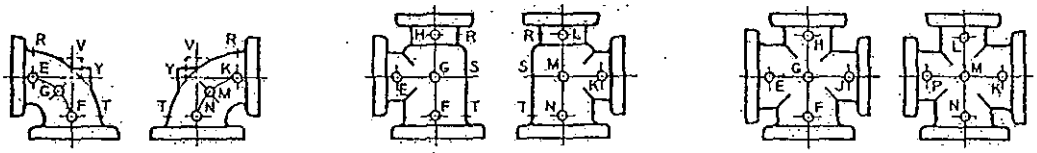
cast iron flanged

method of designating location of tapped holes for drains when specified

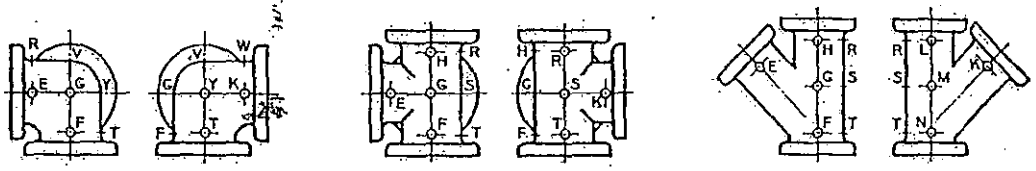
standard and extra heavy



90° elbow, *straight size* | 90° elbow | tee, *straight size* | cross, *straight size*



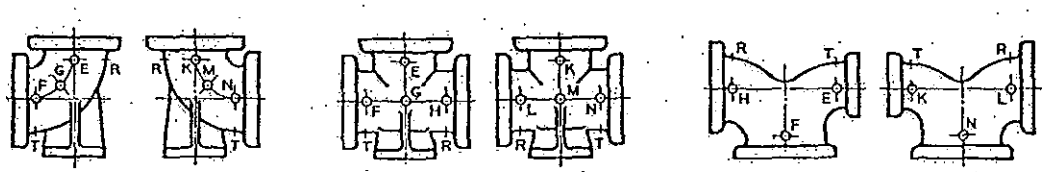
90° elbow, *reducing size* | tee, *reducing size* | cross, *reducing size*



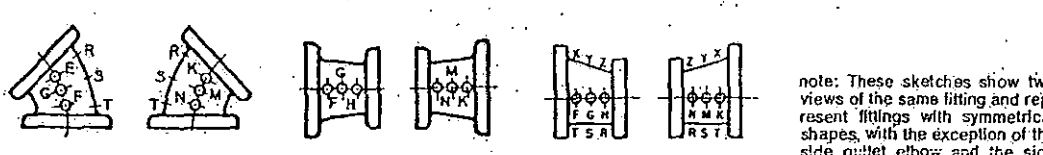
front view | side view
side outlet elbow, *straight size*

front view | side view
side outlet tee, *straight size*

45° lateral
straight size



90° base elbow | base tee | double branch elbow



45° elbow | concentric reducer | eccentric reducer

note: These sketches show two views of the same fitting and represent fittings with symmetrical shapes, with the exception of the side outlet elbow and the side outlet tee (straight sizes).

pressure ratings, psi (sizes thru 12 inch) { saturated steam: 250 / liquid & gas at 150° F: 400

specifications

All Extra Heavy or "Class 250" Cast Iron Flanged Fittings in sizes listed are made to American National Standard ANSI B16.2 and are marked G-250. Shipped with flanges faced and drilled American Extra Heavy Standard unless otherwise specified. Federal specifications for flange dimensions: WW-F-406b. Material specifications: ASTM A 126 Class B.

Grinnell fittings sizes 1 to 10-inch, shown in this section are included in the "List of Inspected Fire Protection Equipment and Materials" issued by the Underwriters' Laboratories, Inc.

sizes

To avoid delay in shipment, where other than sizes given are ordered, we carry in stock reducing flanges, the use of which, in connection with straight or reducing fittings carried in stock, enable us to fill orders promptly for reducing sizes where specifications will permit reduction made in this manner. The reducing flanges furnished are the same thickness as the regular companion flange of the corresponding outside diameter and will be drilled to the template corresponding to the outside diameter unless otherwise ordered. For fittings reduced in this manner, please specify "reduce by flanges if necessary."

To order reducing companion flanges, specify threaded or reduced size first, then the outside diameter of flange wanted. For instance, if a reducing flange is required to connect a 4-inch pipe to a 6-inch valve or fitting having a 12½-inch O.D. flange, order: 4 x 12½-inch reducing flange.

dimensions

All Extra Heavy or "Class 250" Cast Iron Flanged Fittings have a raised face (for gaskets) 1/16-inch high inside of bolt holes. For bolts 1⅛-inch and smaller, bolt hole is drilled ⅛ inch larger than diameter of bolt. Bolt holes straddle center line. Steel bolts with square heads and hex nuts are recommended.

Reducing elbows have same dimensions center to face as regular elbows of largest straight size.

Reducing tees 16" and smaller have same center-to-face and face-to-face dimensions as a straight fitting of the size of the largest opening. Dimensions for larger sizes furnished on request.

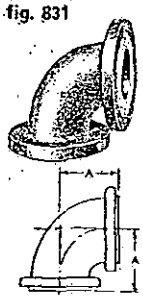
tolerances

Inspection limit of plus or minus 1/32 inch is allowed on all center to contact surface dimensions for sizes up to and including 10-inch; plus or minus 1/16 inch on sizes larger than 10-inch. Inspection limit of plus or minus 1/16 inch is allowed on all contact surface to contact surface dimensions for sizes up to and including 10-inch; plus or minus 1/8 inch on sizes larger than 10-inch.

*Patterns are designed to produce castings having the wall thicknesses given in the tables. The wall thicknesses of the castings at no point shall be less than 87½ per cent of the dimensions given.

elbows

90° elbow
fig. 831



A: center to face

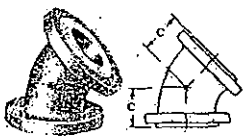
size, in.	A in.	diameter of flange, in.	thickness of flange (min.), in.	diameter of raised face, in.	wall thickness of body (min.), in.*	weight (approx) each, lb.
2	5	6½	7/16	4 3/16	5/16	20
2½	5½	7½	1	4 15/16	½	30
3	6	8¼	1 1/16	5 11/16	5/16	40
4	7	10	1¼	6 15/16	5/8	65
5	8	11	1 3/16	8 3/16	11/16	87
6	8½	12½	1 5/16	9 11/16	¾	115
8	10	15	1 7/16	11 15/16	13/16	185
10	11½	17½	1 7/16	14 1/16	15/16	290
12	13	20½	2	16 1/16	1	410

cast iron flanged — **250 lb, extra heavy**

pressure ratings, psi (sizes thru 12 inch): saturated steam; 250 / liquid & gas at 150° F: 400

elbows, *cont'd*

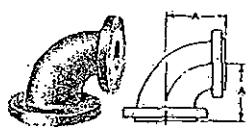
45° elbow fig. 832



C: center to face

size, in.	C in.	diameter of flange, in.	thickness of flange (min.), in.	diameter of raised face, in.	wall thickness of body (min.), in.*	weight (approx) each, lb.
2	3	6½	7/8	4 3/16	3/16	18
2½	3½	7½	1	4 13/16	¼	28
3	3½	8¼	1 1/8	5 11/16	5/16	35
4	4½	10	1¼	6 13/16	5/8	58
5	5	11	1¼	8 5/16	11/16	76
6	5½	12½	1 3/8	9 11/16	¾	105
8	6	15	1 5/8	11 15/16	13/16	155
10	7	17½	1 7/8	14 1/16	15/16	240
12	8	20½	2	16 5/16	1	340•

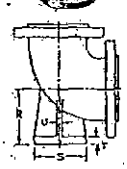
taper reducing elbow: fig. 833



A: center to face

size, in.		A in.	weight (approx) each, lb.	size, in.		A in.	weight (approx) each, lb.
2½	2	5½	28	6	5	8½	100
					4		93
3	2½	6	35	8	6	10	155
4	3	7	52		5		140
	2½		48		4		130•
5	4	8	78	10	8	11½	240
	3		65		6		210
					5		190

base elbow fig. 835



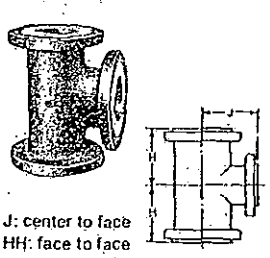
size, in.	center to base, R, in.	diam. of round base, S, in.	thick. of base, T, in.	thick. of ribs, U, in.	size supporting pipe for base	weight (approx) each, lb.
4	6	6½	⅞	⅝	2	88•
5	6¾	7½	1	¾	2½	120•
6	7½	7½	1	¾	2½	160•
8	9	10	1¼	⅞	4	240•
10	10½	10	1¼	⅞	4	350•

Bases, when drilled, should be drilled to the template of the flange of the supporting pipe size.

Bases will be furnished not faced and not drilled unless otherwise specified. When ordered faced, dimensions "R" and "T" will be slightly less than shown in table.

tees

straight: fig. 841



J: center to face
HH: face to face

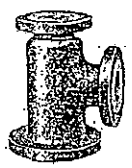
straight size, in.	min. inside diameter of fitting, in.	J in.	HH in.	diameter flange, in.	thick. of flange (min.), in.	diameter of raised face, in.	wall thick. of body (min.), in.*	weight (approx) each, lb.
2	2	5	10	6½	⅞	4 3/16	5/16	32
2½	2½	5½	11	7½	1	4 13/16	¼	46
3	3	6	12	8¼	1 1/8	5 11/16	5/16	58
4	4	7	14	10	1¼	6 13/16	5/8	99
5	5	8	16	11	1 3/8	8 5/16	11/16	135
6	6	8½	17	12½	1 1/4	9 11/16	¾	180
8	8	10	20	15	1 5/8	11 15/16	13/16	280
10	10	11½	23	17½	1 7/8	14 1/16	15/16	430
12	12	13	26	20½	2	16 5/16	1	620

• Not stocked
* See note page pf-53.

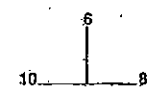
tees, *cont'd*

size, in. reducing			weight (approx) each, lb.	size, in. reducing			weight (approx) each, lb.
2½	2½	2	42	6	6	4	160
						3	148
3	3	2½	55				
		2	50				
4	4	3	84	8	8	6	257
		2½	83			4	229
		2	77				
5	5	4	125	10	10	8	376
						6	369

tee, reducing on run or outlet: fig. 842



In describing tees, the run is first named, then the outlet, thus:

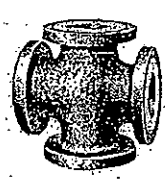


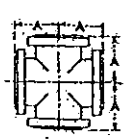
= 10 × 8 × 6

Dimensions for reducing tees for sizes listed 16" and smaller have same center to face dimension as straight size fittings corresponding to the largest opening. Dimensions of sizes not listed furnished on request.

cross

fig. 851





A: center to face
AA: face to face

size, in.	A in.	AA in.	diameter of flange, in.	thick. of flange (min.), in.	diameter of raised face, in.	wall thick. in.*	weight (approx) each, lb.
2	5	10	6½	7/8	4 3/16	7/16	41•
2½	5½	11	7½	1	4 15/16	½	58•
3	6	12	8¼	1 1/16	5 11/16	9/16	74•
4	7	14	10	1 1/16	6 15/16	5/8	130•
5	8	16	11	1 3/16	8 3/16	11/16	170•
6	8½	17	12½	1 3/16	9 11/16	¾	230•
8	10	20	15	1 5/16	11 15/16	13/16	350•
10	11½	23	17½	1 7/16	14 1/16	15/16	540•

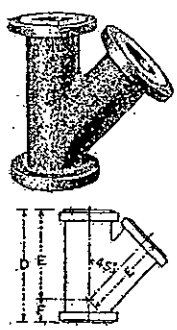
* See note page pf-53.
• Not stocked

cast iron flanged — 250 lb, extra heavy

pressure ratings, psi (sizes thru 12 inch) { saturated steam: 250 / liquid & gas at 150° F: 400

lateral

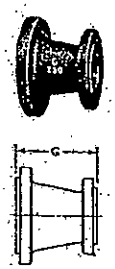
fig. 853



size, in.	D in.	E in.	F in.	diameter of flange, in.	thick. of flange, in.	diameter of raised face, in.	wall thick. of body (min.), in.*	weight (approx) each, lb.
3	14	11	3	8¼	1⅛	5¹¹⁄₁₆	⅜	73•
4	16½	13½	3	10	1¼	6¹⁵⁄₁₆	⅜	120•
5	18½	15	3½	11	1⅜	8⅜	⅜	165•
6	21½	17½	4	12½	1⅜	9¹⁵⁄₁₆	¾	230•
8	25½	20½	5	15	1⅝	11¹³⁄₁₆	⅜	360•
10	29½	24	5½	17½	1⅞	14¼	⅜	570•

reducer

concentric reducer
fig. 855



G: face to face

size, in.		G in.	weight (approx) each, lb.	size, in.		G in.	weight (approx) each, lb.
[illegible]	2	5½	24	6	5	9	85
					4		77
3	2½	6	29		3		67
	2		25		2½		63
					2		59•
4	3	7	44	8	6	11	130
	2½		40		5		115
	2		38		4		105
5	4	8	63	10	8	12	180
	3		54		6		170
	2½		50		5		155•
	2		46•		4		145•

Drilling templates in multiples of four, so that fittings may face in any quarter. Bolt holes straddle center line.

* See note page pf-53.
• Not stocked

iron flanges — 125 lb, standard

pressure ratings, psi — saturated steam: 1 to 12 inch: 125; 14 to 24 inch: 100; liquid & gas at 150°F: 1 to 12 inch: 175; 14 to 24 inch: 150

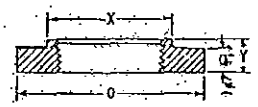
125 lb. standard iron flanges are manufactured to American National Standards: dimensions, ANSI B16.1; threads, ANSI B2.1; cast iron material, ASTM A 126 Class B; malleable iron material, ASTM A-47 Grade 32510; dimensions also to Federal specifications WW-F-406b.

companion flange

cast iron: fig. 1011
malleable: fig. 1035

showing hub

showing plain face



□ CI only.

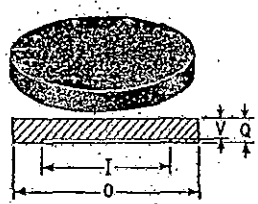
pipe size, I, in.	diam. of flange O, in.	thick. of flange (min.), Q, in.	diam. of hub (min.), X, in.	length through hub★ (min.), Y, in.	weight (approx) each, lb. cast iron★	weight (approx) each, lb. malleable
□¾	3⅞	7/16	1¾	⅝	1.50	....
1	4¼	7/16	1 15/16	11/16	1.75	....
1¼	4⅝	½	2⅜	11/16	2.00	....
1½	5	9/16	2⅝	¾	2.25	2.25
2	6	⅝	3¼	1	4.00	4.00
2½	7	11/16	3¾	1⅛	6.00	6.00
3	7½	¾	4¼	1 3/16	7.63	7.63
3½	8½	13/16	4 13/16	1¼	9.00	9.00
4	9	15/16	5⅜	1⅜	11.75	11.75
5	10	15/16	6⅜	1⅜	14.00	14.00
6	11	1	7⅜	1⅜	16.50	16.50
8	13¼	1⅛	9 5/16	1¾	26.00	26.00
10	16	1⅜	11 5/16	1 15/16	37.75	....
12	19	1¼	14⅛	2⅜	50.50	....
14 O.D.	21	1⅜	15⅝	2¼	80.00	....
16 O.D.	23½	1 7/16	17½	2½	100.00	....
18 O.D.	25	1 9/16	19⅝	2 11/16	106.00	....
20 O.D.	27½	1 11/16	21¾	2⅞	128.00	....
24 O.D.	32	1⅞	26	3¼	202.00	....

When ordering companion flanges always give outside diameter as well as nominal pipe size.

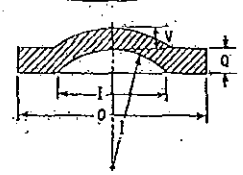
blind flange

cast iron: fig. 1018
malleable: fig. 1038

10 x 16 inches and smaller



12 x 19 inches and larger



pipe size, I, in.	diam. of flange O, in.	thick. of flange (min.), Q, in.	wall thick. V, in.	weight (approx) each, lb. cast iron★	weight (approx) each, lb. malleable
1	4¼	7/16	5/16	2.00	....
1¼	4⅝	½	5/16	2.25	....
1½	5	9/16	½	3.75	....
2	6	⅝	5/16	4.00	4.00
2½	7	11/16	⅝	6.75	6.75
3	7½	¾	11/16	8.00	8.00
3½	8½	13/16	¾	11.00	11.00
4	9	15/16	⅞	14.00	14.00
5	10	15/16	⅞	18.00	18.00
6	11	1	15/16	23.00	23.00
8	13½	1⅛	1 1/16	40.00	40.00
10	16	1⅜	1⅛	59.00	....
12	19	1¼	1 3/16	88.00	....
14 O.D.	21	1⅜	⅞	115.00	....
16 O.D.	23½	1 7/16	1	160.00	....
18 O.D.	25	1 9/16	1 1/16	190.00	....
20 O.D.	27½	1 11/16	1⅛	250.00	....
24 O.D.	32	1⅞	1¼	370.00	....

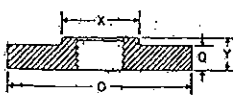
All Standard blind flanges, sizes 12 inch (19 inch O.D.) and larger must be dished, with inside radius equal to the port diameter.

When ordering blind flanges always give outside diameter.

★ All 125 lb cast iron standard flanges have a flat face.

reducing companion flange

cast iron: fig. 1016
malleable: fig. 1036



To order reducing companion flanges, specify threaded or reduced size first, then the outside diameter of flange wanted. For instance, if a reducing flange is required to connect a 5 inch pipe to an 8 inch valve or fitting having a 13½ inch O.D. flange, order: 5 x 13½ inch reducing flange.

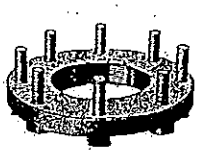
pipe size, in.	diam. of flange O, in.	thick. of flange (min.) Q, in.	diam. of hub (min.) X, in.	length through hub★ (min.) Y, in.	weight (approx) each, lb. cast iron	weight (approx) each, lb. malleable
1	5	7/16	1 13/16	1 1/16	2.75▪	.....
1¼			2 3/16	1 1/16	2.50▪	.....
1	6	5/8	1 13/16	1 1/16	5.00▪	.....
1¼			2 5/16	1 3/16	4.75▪	4.75
1½			2 7/16	1 5/16	4.50▪	4.50
1½	7	11/16	2 5/16	1 5/16	7.00▪	.....
2			3 1/16	1	6.75▪	6.75
1	7½	¾	1 15/16	1 3/16	9.00▪	.....
1½			2 5/16	1 5/16	8.75▪	.....
2			3 1/16	1	8.50▪	8.50
2½			3 5/16	1 1/16	8.00▪	.....
3	8½	13/16	4¼	1 3/16	10.00	10.00
1½	9	15/16	2 5/16	1	14.75▪	.....
2			3 1/16	1	14.00▪	.....
2½			3 5/16	1 1/16	13.50▪	.....
3			4¼	1 3/16	12.75▪	12.75▪
3½			4 5/16	1¼	12.00	.....
3	10	15/16	4¼	1 3/16	17.00▪	.....
4			5 3/16	1 3/16	16.00▪	16.00
1½	11	1	2 5/16	1 1/16	27.00▪	.....
2			3 1/16	1 1/16	26.00▪	.....
2½			3 5/16	1 1/16	25.00	.....
3			4¼	1 3/16	23.00▪	.....
4			5 3/16	1 5/16	21.00▪	21.00▪
5			6 5/16	1 7/16	19.00▪	.....
2	13½	1 1/16	3 5/16	1 1/16	44.00▪	.....
3			4¼	1 3/16	40.00	.....
4			5 3/16	1 1/16	37.00▪	.....
5			6 5/16	1 7/16	34.00	.....
6			7 5/16	1 5/16	31.00▪	31.00
6	16	1 3/16	7 5/16	1 5/16	53.00▪	.....
8			9 5/16	1 1/16	50.00▪	.....
6	19	1¼	7 5/16	1 5/16	88.00	.....
8			9 5/16	1 1/16	81.00	.....
10			11 5/16	1 5/16	72.00	.....

125 lb cast iron flanges threaded for cast iron pipe figs. 1010T

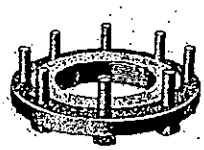
nominal pipe size	flange O. D.	C. I. Pipe O. D.	flange thickness	length thru hub	weight, lbs. each faced	weight, lbs. each not faced
3	7½	3.96	¾	1¾	7.5	8.0
4	9	4.80	15/16	1 15/16	13.0	13.8
6	11	6.90	1	2 3/16	17.2	18.5
8	13½	9.05	1¼	2 7/16	29.0	30.1
10	16	11.10	1 3/16	2½	42.0	43.5
12	19	13.20	1½	2 15/16	60.0	62.0

Flanges drilled to USAS B16.1, Class 125.
Flanges furnished threaded, drilled and faced.

all-purpose asbestos gaskets



full face



ring

Compressed Asbestos Sheet Packing is a single-formula material suitable for a wide range of temperature-pressure combinations. It is used for sealing water, steam, all oils, gases, alkalies, acids, refrigerants and hydrocarbons. Available in eight gauges: 1/100, 1/64, 1/32, 1/16, 3/32, 1/8, 3/16, and 1/4 inch.

★All 125 lb cast iron standard flanges have a flat face.
▪ Stocked galvanized.

templates for drilling standard flanged fittings

pipe size, in.	diameter of flange, in.	thickness of flange (min), in.	diameter of bolt circle, in.	number of bolts	diameter of bolt holes, in.	diameter of bolts, in.	length of bolts, in.	I.D. of gasket	O.D. of ring gasket	O.D. of full face gasket
1	4¼	7/16	3⅛	4	⅝	½	1¾	1⅜	2⅝	4¼
1¼	4⅝	½	3½	4	⅝	½	2	1 11/32	3	4⅝
1½	5	7/16	3⅞	4	⅝	½	2	1 11/32	3⅜	5
2	6	⅝	4¾	4	¾	⅝	2¼	2⅛	4⅛	6
2½	7	11/16	5½	4	¾	⅝	2½	2⅜	4⅞	7
3	7½	¾	6	4	¾	⅝	2½	3½	5⅜	7½
3½	8½	13/16	7	8	¾	⅝	2¾	4	6¾	8½
4	9	15/16	7½	8	¾	⅝	3	4½	6⅞	9
5	10	15/16	8½	8	⅞	¾	3	5 9/16	7¾	10
6	11	1	9½	8	⅞	¾	3¼	6⅝	8¾	11
8	13½	1⅛	11¾	8	⅞	¾	3½	8⅝	11	13½
10	16	1 3/16	14¼	12	1	⅞	3¾	10¾	13¾	16
12	19	1¼	17	12	1	⅞	3¾	12¾	16¼	19
14 O.D.	21	1⅜	18¾	12	1⅛	1	4¼	14	17¾	21
16 O.D.	23½	1 7/16	21¼	16	1⅛	1	4½	16	20¼	23½
18 O.D.	25	1 9/16	22¾	16	1¼	1⅛	4¾	18	21⅜	25
20 O.D.	27½	1 11/16	25	20	1¼	1⅛	5	20	23½	27½
24 O.D.	32	1⅞	29½	20	1⅜	1¼	5½	24	28¼	32

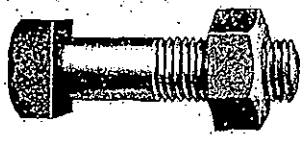
Drilling templates are in multiples of four, so that fittings may be made to face in any quarter. Bolt holes straddle the center line.

templates for drilling extra heavy flanged fittings

pipe size, in.	diameter of flange, in.	thickness of flange (min), in.	diameter of raised face, in.	diameter of bolt circle, in.	number of bolts	diameter of bolt holes, in.	diameter bolts, in.	length of bolts, in.	I.D. of gasket	O.D. of ring gasket
1	4⅛	11/16	2 11/16	3½	4	¾	⅝	2½	1 5/16	2⅜
1¼	5¼	¾	3 1/16	3⅞	4	¾	⅝	2½	1 11/32	3¼
1½	6⅛	13/16	3⅝	4½	4	⅞	¾	2¾	1 11/32	3¾
2	6½	⅞	4⅜	5	8	¾	⅝	2¾	2⅜	4⅜
2½	7½	1	4 15/16	5⅞	8	⅞	¾	3¼	2⅞	5⅛
3	8¼	1⅛	5 11/16	6⅝	8	⅞	¾	3½	3½	5⅞
3½	9	1 3/16	6⅜	7¼	8	⅞	¾	3½	4	6½
4	10	1¼	6 15/16	7⅞	8	⅞	¾	3¾	4½	7¼
5	11	1⅜	8 5/16	9¼	8	⅞	¾	4	5 9/16	8½
6	12½	1⅜	9 11/16	10⅝	12	⅞	¾	4	6⅝	9¾
8	15	1⅝	11 13/16	13	12	1	⅞	4½	8⅝	12¼
10	17½	1¾	14 1/16	15¼	16	1⅛	1	5¼	10¾	14¼
12	20½	2	16 5/16	17¾	16	1¼	1⅛	5½	12¾	16⅝

Drilling templates are in multiples of four, so that fittings may be made to face in any quarter. Bolt holes straddle the center line.

machine bolts



When ordering, specify bolt size and length required. Bolts are furnished in sizes ¼, 5/16, ⅜, 7/16, ½, 9/16, ⅝, ¾, ⅞, 1, 1⅛, 1¼ inch, in varying lengths. Lengths of bolts are measured from under head to extreme point.

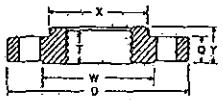
iron flanges — 250 lb, extra heavy

pressure ratings, psi { saturated steam: 1 to 12 inch: 250; liquid & gas at 150° F: 1 to 12 inch: 400

250 lb. extra heavy iron flanges are manufactured to American National Standards: dimensions, ANSI B16.2; threads ANSI B2.1; cast iron material, ASTM A 126 Class B; malleable iron material, ASTM A 47 Grade 32510; dimensions also to Federal specifications WW-F-406b.

companion flange

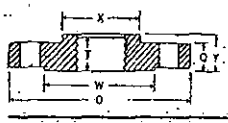
cast iron: fig. 1025
malleable: fig. 1039
showing raised face



pipe size, in.	diam. of flange O, in.	thick. of flange (min.) Q, in.	diam. of hub (min.) X, in.	length through hub★ (min.) Y, in.	length of threads (min.) T, in.	diam. of raised face, W, in.	weight (approx) each, lb. cast iron	weight (approx) each, lb. malleable
1¼	5¼	¾	2½	1	0.76	2½	3.75	.....
1½	6⅛	13/16	2¾	1⅛	0.87	3⅛	5.75	.....
2	6½	⅞	3⅜	1¼	1.00	4⅛	6.50	6.50
2½	7½	1	3¹⁵⁄₁₆	1⅜	1.14	4¹⁵⁄₁₆	9.50	9.50
3	8¼	1⅛	4⅝	1⅜	1.20	5¾	12.33	12.33
3½	9	1³⁄₁₆	5¼	1⅝	1.25	6⅝	16.00	.....
4	10	1¼	5¾	1¾	1.30	6¹⁵⁄₁₆	20.00	20.00
5	11	1⅜	7	1⅞	1.41	8⅛	24.00■	24.00
6	12½	1⅜	8⅛	1¹⁵⁄₁₆	1.51	9¹⁵⁄₁₆	32.00■	32.00
8	15	1⅝	10¼	2³⁄₁₆	1.71	11¹⁵⁄₁₆	51.00	51.00
10	17½	1⅞	12⅝	2⅜	1.92	14⅛	77.00	.....
12	20½	2	14¾	2⅝	2.12	16⅞	103.00	.....

red. companion flange

cast iron: fig. 1030Δ

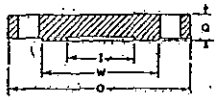


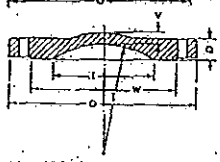
pipe size, in.	diameter of flange O, in.	thickness of flange (min.) Q, in.	length through hub★ (min.) Y, in.	length of threads (min.) T, in.	diameter of raised face W, in.	weight (approx) each, lb. cast iron
2	8¼	1⅛	1¼	1.00	5¹⁵⁄₁₆	14.25
2½	8¼	1⅛	1⅜	1.14	5¹⁵⁄₁₆	13.50
3	10	1¼	1⅜	1.20	6¹⁵⁄₁₆	22.75
4	11	1⅜	1¾	1.30	8⅜	30.00
4	12½	1⅜	1¾	1.30	9¹⁵⁄₁₆	39.50
5	12½	1⅜	1⅞	1.41	9¹⁵⁄₁₆	36.00
6	15	1⅜	1¹⁵⁄₁₆	1.51	11¹⁵⁄₁₆	59.00

To order reducing companion flanges, specify threaded or reduced-size first, then the outside diameter of flange wanted. For instance, if a reducing flange is required to connect a 4 inch pipe to a 6 inch valve or fitting having a 12½ inch O.D. flange, order 4 x 12½ inch reducing flange.

blind flange

cast iron: fig. 1021
8 x 15 inches and smaller





10 x 17½ inches and larger

pipe size, in.	diameter of flange O, in.	diameter of port I, in.	thickness of flange (min.) Q, in.	metal thickness (min.) V, in.	weight (approx) each, lb. cast iron
1	4⅛	1	11/16	...	4.0
1¼	5¼	1¼	¾	...	4.5
1½	6⅛	1½	13/16	...	5.25
2	6½	2	⅞	...	7.00
2½	7½	2½	1	...	11.00
3	8¼	3	1⅛	...	14.00
3½	9	3½	1³⁄₁₆	...	19.00
4	10	4	1¼	...	23.00
5	11	5	1⅜	...	31.00
6	12½	6	1⅜	...	42.00
8	15	8	1⅝	...	70.00
10	17½	10	1⅞	13/16	104.00
12	20½	12	2	1	145.00

Blind flanges sizes 10 inch (17½ inch O.D.) and larger must be dished, with inside radius equal to the port diameter.

Δ Available black only.

★ All 250 lb cast iron standard flanges have a 1/16 inch raised face, which is included in the minimum thickness of flange dimensions.

■ Stocked galvanized.

connecting pieces

fig. 545, 566

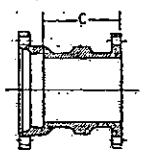
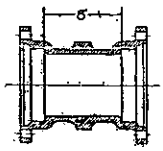


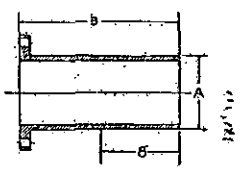
fig. 570○



size in.	body O.D., in.	plain end diam., A, in.	weight (approx) each, lb. mechanical joint and mechanical joint fig. 570	mechanical joint and flange fig. 566 C = 8 in.	mechanical joint and flange fig. 545 C = 21½ in.
3	3.96	3.96	35•	30•	...
4	5.00	4.80	45	40	64
6	7.10	6.90	70	60	112
8	9.30	9.05	95	85	154
10	11.40	11.10	130	115	190
12	13.50	13.20	165•	155•	265

• Not stocked
○ Solid boss suitable for a 3" max. IPS tap.

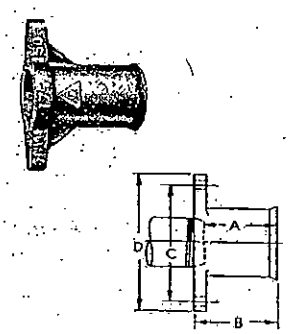
fig. 544, 544A, 567A



size in.	body O.D. in.	plain end diam. A, in.	weight (approx) each, lb. flange and plain end fig. 567A B = 18 in.	fig. 544 B = 24 in.	fig. 544A B = 36 in.
3	3.96	3.96	32	50	...
4	5.00	4.80	42	72	49
6	7.10	6.90	64	110	80
8	9.30	9.05	98	162	120
10	11.10	11.10	130	218	160
12	13.20	13.20	180	295	218

Warren coupling

threaded and spigot ends
fig. 533



size, in.		A in.	B in.	C in.	D in.	weight (approx) each, lb.
3	3	8¾	9	8¼	10¼	16
	2½	8⅞	9	8¼	10¼	17
	2	8⅞	9	8¼	10¼	18
4	4	7¹⁵⁄₁₆	9	9¼	11¼	23
	3	8⅛	9	9¼	11¼	25
	2½	8⅛	9	9¼	11¼	26
	2	8⅛	9	9¼	11¼	26
6	6	7¾	9	12	14	34
	5	7¹³⁄₁₆	9	12	14	37
	4	7¹³⁄₁₆	9	12	14	41
	3	8⅛	9	12	14	42
8	8	7⅞	9	14¼	16¼	51
	6	7¾	9	14¼	16¼	59

3 inch sizes do not carry approval marking.
Reduced outlets are sand-bushed from straight sizes.

cast brass threaded

standard weight fittings *for working steam pressures to 125 lbs.*

extra heavy fittings for working steam pressures to 250 lbs. available rough or polished finish.
Also chrome plated. Specify finish when ordering.

elbows⊙

description	figure number standard	extra heavy
90° straight	1211	1271
90° reducing	1212	1273
90° right and left	1211L	1272
90° street	1224	1270
45° standard	1213	1274
45° street	1224A	....
side outlet	1214	....
drop female	1225	....

crosses⊙

description	figure number standard	extra heavy
straight	1218	1277
reducing	1219	1278

return bends

description		figure number standard	extra heavy
close	right hand	1235	1282
	right & left	1235L	1282L
open	right hand	1236	1283
	right & left	1236L	1283L

bushings⊙

description		figure number standard	extra heavy
hex	reducing 2 sizes	1229	....
	reducing 3 or more sizes	1229	....
face	reducing 2 sizes	1230	....
	reducing 3 or more sizes	1230	....

plugs⊙

description	figure number standard	extra heavy
square head, cored	1232	....
solid	1233	....
countersunk	1234	....

caps⊙

figure number standard	extra heavy
1228	1284

laterals⊙

figure number standard	extra heavy
1220	1279

crossovers

figure number (standard wt. only)
1239

extension pieces

figure number (standard wt. only)
1240

hexagon locknuts

figure number (standard wt. only)
1231

tees⊙

description		figure number standard	extra heavy
straight		1215	1275
reducing	1 opening	1216	1276
	2 openings	1216	1276
street or service		1238	....
side outlet		1217	....
drop (single ear)		1226	....

couplings⊙

description	figure number standard	extra heavy
right hand	1222	1280
right and left	1223	1280L

reducers⊙

description	figure number standard	extra heavy
reducing 2 sizes	1221	1281
reducing 3 or more sizes	1221	1281

unions, ground joint

description	figure number
round end, 125 lb.	484
standard octagon, 125 lb.	484A
government octagon, 250 lb.	485
male and female, 250 lb.	489
hexagon, 300 lb.	486A

union fittings

description		figure number
female union elbow		453
male union elbow		454
female union tee	union on run	455
	union on outlet	456
male union tee	union on run	457
	union on outlet	458

companion flanges (faced and drilled)

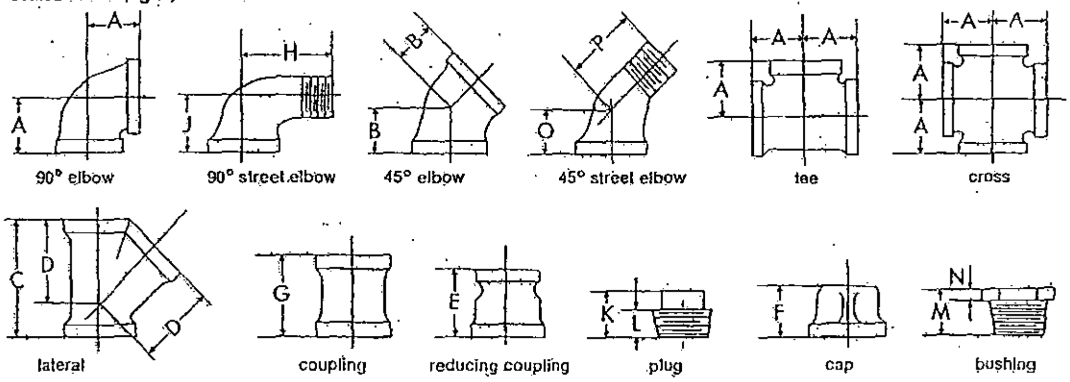
description	figure number
standard, 150 lb.	1045
extra heavy, 300 lb.	1047

⊙ Dimensions listed on page 63 and 64.

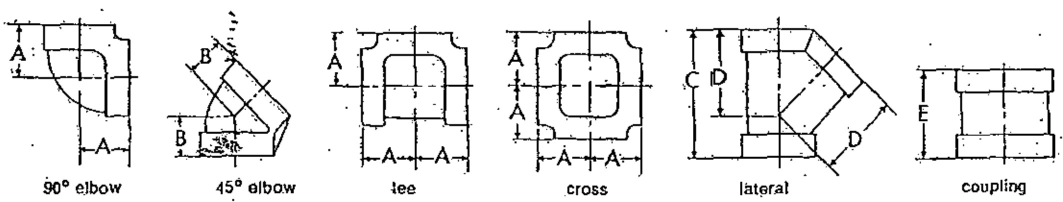
Standard weight brass I.P.S. threaded fittings are made in accordance with American National Standard ANSI B16.15-1947, Federal Specification WW-P-460, and Military Specification Mil-F-1184. Extra heavy fittings are made in accordance with American National Standard ANSI B16.17-1949, Federal Specification WW-P-460, and Military Specification Mil-F-1181.

Dimensions are subject to slight variations and to changes without notice.

standard weight, 125 lb



extra heavy, 250 lb



dimensions (inches)

size	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
standard weight (straight sizes only)													
A	11/16	49/64	13/16	31/32	1 5/32	1 17/32	1 21/32	1 7/8	2 3/64	2 11/16	3 5/32	3 3/32	3 17/32
B	13/32	9/16	5/8	3/4	7/8	15/16	1 5/32	1 9/32	1 7/16	1 27/32	2	2 5/32	2 3/16
C	1 3/8	1 7/8	2 1/8	2 15/32	2 5/8	3 3/16	3 7/8	4 3/16	4 15/64	6 1/4	7 1/4	8 1/8	9 1/8
D	1	1 9/32	1 7/16	1 3/4	1 7/8	2 1/2	2 15/16	3 1/8	3 5/8	4 11/16	5 3/16	6 3/16	7 1/8
E◇	...	57/64	1 1/32	1 3/16	1 5/16	1 23/32	1 9/16	1 11/16	2	2 3/16	2 5/8	3	3 3/16
F	11/32	5/8	5/8	3/4	13/16	7/8	1	1 1/16	1 7/32	1 1/2	1 13/16	1 23/32	1 15/16
G	7/8	1	1 1/16	1 1/4	1 1/2	1 23/32	1 27/32	1 31/32	2 1/8	2 7/8	3 3/16	3 5/32	3 11/16
H	7/8	1 3/32	1 1/4	1 1/2	1 5/8	1 15/16	2 1/4	2 3/8	2 7/8	...	...	...	...
J	9/16	3/4	13/16	31/32	1 3/16	1 1/2	1 11/16	1 13/16	2 1/8	...	...	...	...
K	41/64	11/16	3/4	29/32	1	1 1/4	1 5/16	1 7/16	1 1/2	1 11/16	1 15/16	2	2 1/8
L	25/64	29/64	15/32	9/16	37/64	3/4	49/64	13/16	27/32	1 1/32	1 1/8	1 3/16	1 1/4
M	...	9/16	5/8	3/4	7/8	1 1/32	1 3/32	1 1/8	1 1/4	1 1/2	1 11/32	1 3/4	1 5/8
N	...	1/8	3/16	3/16	7/32	1/4	1/4	5/16	5/16	3/8	3/8	13/32	13/32
O	1/2	9/16	13/16	7/8	15/16	1 1/16	1 1/4	1 5/16	1 17/32	...	...	...	...
P	3/4	15/16	15/16	1 1/8	1 3/16	1 19/32	1 3/4	1 3/4	1 15/16	...	...	...	...

◇ For a reduction of one size only.

cast brass threaded

dimensions (inches)

size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
extra heavy (straight sizes only)													
A	5/8	11/16	7/8	1 1/16	1 1/4	1 1/2	1 3/4	1 15/16	2 3/16	2 3/4	3 1/8	3 1/2	3 15/16
B	....	1/8	1/4	1 3/16	1 5/16	1 1/16	1 1/4	1 3/8	1 3/16	1 13/16	2 3/16	2 3/16	2 1/2
C	....	....	.....	2 1/2	3 3/16	3 1/2	4 3/16	4 13/16	5 13/16	6 1/2	7 13/16	8 1/4	9 13/16
D	....		....	1 7/8	2 3/16	2 5/8	3 3/16	3 5/8	4 1/4	4 5/8	6 1/8	6 1/4	7 1/8
E	....		1 1/4	1 3/8	1 3/4	1 3/4	2	2 1/4	2 1/2	3	3 1/2	3 3/4	3 3/4

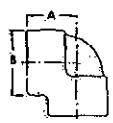
weights (lbs per 100 pieces)

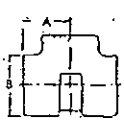
size, in.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	4
standard weight												
90° elbow	7	11	18	23	42	64	93	132	208	325	463	875
45° elbow	6	10	16	23	40	53	84	106	171	263	388	637
90° street ell	5	10	15	21	35	64	85	125	200	▲	▲	▲
tee	12	20	30	43	67	103	140	205	325	575	675	1275
coupling	6	9	13	19	33	51	66	93	138	234	330	556
cap	5	7	11	14	22	32	49	62	96	166	241	450
plug, sq. hd.	▲	▲	▲	9	16	25	38	50	75	150	175	300
plug, solid	2.5	3.8	8	13	25	45	70	93	150	250	375	750
plug, count'k	1	2.5	5	8	10	25	40	65	95	200	300	500
extra heavy												
90° elbow	▲	24	28	48	80	119	184	238	375	600	925	1525
tee	▲	31	35	65	105	165	249	363	512	825	1175	2225
coupling	▲	16	24	38	67	94	130	190	254	450	650	1100

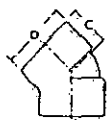
▲ Weights on application.

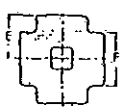
forged steel threaded

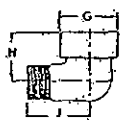
Forged steel threaded fittings conform to ASTM-A-181 Grade 1 and are made in accordance with Manufacturers Standardization Society of the Valve and Fitting Industry SP-49 and SP-50.


90° elbow

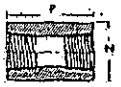

tee

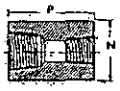

45° elbow

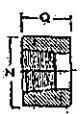

cross

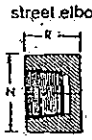

street elbow


lateral


coupling


reducer


half coupling

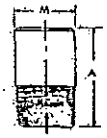

pipe cap

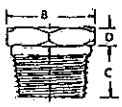
dimensions (inches)

size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
2000 lb													
A	13/16	13/16	31/32	1 1/8	1 5/16	1 1/2	1 3/4	2	2 3/8	3	3 3/8	....	4 3/16
B	7/8	7/8	1	1 5/16	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 5/16	4 3/16	....	5 1/4
C	11/16	11/16	3/4	7/8	1	1 1/4	1 5/16	1 3/8	1 7/16	2 1/16	2 1/2	....	3 1/16
D	7/8	7/8	1	1 5/16	1 1/2	1 13/16	2 5/16	2 1/16	2 31/32	4	4 3/16	....	5 1/4
E	13/16	13/16	31/32	1 1/16	1 5/16	1 1/2	1 3/4	2	2 5/16	3 1/16	3 1/16	....	4 3/16
F	7/8	7/8	1	1 5/16	1 1/2	1 13/16	2 5/16	2 1/16	2 31/32	4	4 3/16	....	5 1/4
3000 lb													
A	13/16	31/32	1 1/16	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 1/2	4 1/2
B	1/4	1	1 5/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/4	6	6
C	11/16	3/4	7/8	1	1 1/16	1 5/16	1 3/16	1 11/16	1 23/32	2 1/16	2 1/2	3 1/16	3 1/16
D	7/8	1	1 3/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/4	5 1/4	5 1/4
E	13/16	31/32	1 1/16	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/16	4 3/16	4 3/16
F	7/8	1	1 5/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/16	5 1/4	5 1/2
G	15/16	15/16	1 3/16	1 1/2	1 3/4	2	2 3/16	2 3/4	3 3/16	....	....	....	....
H	7/8	7/8	1 1/16	1 1/16	1 3/16	1 3/4	2	2 1/16	2 1/2	....	....	....	....
J	1 3/4	1 1/4	1 1/2	1 5/16	1 7/16	2 1/4	2 5/16	2 13/16	3 3/16	....	....	....	....
K	....	1 3/4	1 3/4	1 3/4	2 1/4	2 1/2	2 13/16	3 3/16	4 1/4	....	....	....	....
L	....	1 1/2	1 1/2	1 1/2	1 3/4	2	2 5/16	2 3/4	3 5/16	....	....	....	....
M	....	2 1/2	2 1/2	2 1/2	3	3 1/2	4	4 1/2	6	....	....	....	....
N	5/8	3/4	3/4	1 1/16	1 3/16	1 3/4	2 1/4	2 1/2	3	3 5/16	4 1/4	4 3/4	5 1/2
P	1 1/4	1 3/4	1 1/2	1 1/2	2	2 3/16	2 5/16	3 1/16	3 3/4	3 5/16	4 1/4	4 1/2	4 3/4
Q	5/8	11/16	3/4	15/16	1	1 3/16	1 5/16	1 1/16	1 11/16	1 13/16	2 1/16	2 1/4	2 3/16
R	3/4	1	1	1 1/4	1 7/16	1 5/16	1 3/4	1 3/4	1 7/8	2 3/16	2 3/16	2 3/16	2 15/16
6000 lb													
A	31/32	1 1/16	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 3/16	4 1/2	....
B	1	1 5/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/4	5 3/4	6	....
C	3/4	7/8	1	1 1/16	1 5/16	1 3/16	1 11/16	1 23/32	2 1/16	2 1/2	3 1/16	3 1/16	....
D	1	1 3/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/16	5 1/4	5 1/4	....
E	31/32	1 1/4	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/16	4 3/16	4 3/16	....
F	1	1 5/16	1 1/2	1 13/16	2 3/16	2 5/16	2 3/32	3 3/16	4	4 3/16	5 1/4	5 1/4	....
G	15/16	1 3/16	1 1/2	1 3/4	2	2 3/16	2 3/4	3 3/16	....	....	....	....	....
H	7/8	1 1/16	1 1/16	1 3/16	1 3/4	2	2 1/16	2 1/2	....	....	....	....	....
J	1 1/4	1 1/2	1 5/16	1 7/16	2 1/4	2 5/16	2 13/16	3 3/16	....	....	....	....	....
K	....	1 3/4	1 3/4	2 1/4	2 1/2	2 13/16	3 3/16	4 1/4	....	....	....	....	....
L	....	1 1/2	1 1/2	1 3/4	2	2 5/16	2 3/4	3 5/16	....	....	....	....	....
M	....	2 1/2	2 1/2	3	3 1/2	4	4 1/2	6	....	....	....	....	....
N	7/8	1	1 1/4	1 1/2	1 3/4	2 1/4	2 1/2	3	3 5/16	4 1/4	5	5 3/4	6 1/4
P	1 1/4	1 3/16	1 1/2	1 1/4	2	2 3/16	2 5/16	3 1/16	3 3/4	3 5/16	4 1/4	4 1/2	4 3/4
Q	5/8	11/16	3/4	15/16	1	1 3/16	1 5/16	1 1/16	1 11/16	1 13/16	2 1/16	2 1/4	2 3/16
R	3/4	1	1 3/16	1 3/8	1 1/2	1 13/16	1 7/8	1 1/8	2	2 1/2	2 13/16	2 7/8	2 15/16

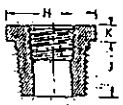
forged steel threaded

pressure ratings, psi (non-shock) class, lb.	2000	3000	6000
cold water, oil, gas, air	2000	3000	6000
900° F steam, hot oil, vapor	615	925	1855


round head plug


hex head plug


square head plug


hexagon bushing


flush bushing

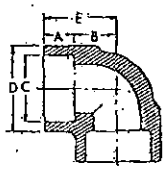
dimensions (inches)

size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
A	1 3/16	1 5/16	1 5/16	1 3/4	1 3/4	2	2	2	2 1/2	2 3/4	2 3/4	3	3
B	7/16	5/8	11/16	7/8	1 1/16	1 3/16	1 3/16	2	2 1/2	3	3 3/4	4 1/4	5
C	7/16	3/8	11/16	3/4	13/16	1	1	1	1 3/16	1 5/16	1 1/2	1 5/8	1 7/8
D	1/4	1/4	5/16	5/8	3/8	3/4	5/8	5/8	11/16	3/4	15/16	7/8	1
E	5/32	3/8	7/16	5/8	5/8	13/16	13/16	1 1/4	1 3/16	1 1/2	1 13/16	1 7/8	2 1/2
F	3/8	7/16	1/2	5/8	5/8	3/4	13/16	13/16	7/8	1 1/16	1 1/4	1 3/8	1 1/4
G	1/4	1/4	5/16	3/8	7/16	1/2	5/8	5/8	11/16	3/4	15/16	7/8	1 1/4
H	....	5/8	11/16	7/8	1 1/16	1 1/16	1 13/16	2	2 1/2	3	3 3/4	4 1/4	5
J	....	1/2	7/16	11/16	3/4	15/16	7/8	15/16	1	1 3/16	1 5/16	1 5/8	1 7/8
K	....	1/8	5/16	5/16	1/4	1/4	3/8	3/8	5/16	1/2	11/16	1/2	1
L	....	3/16	7/16	1/2	5/16	5/16	11/16	3/4	11/16	15/16	1 1/4	1 1/8	1 1/4
M	13/32	13/32	11/16	23/32	1 1/16	1 3/16	1 11/16	1 23/32	2 3/16	2 7/8	3 1/2	4	4 1/2

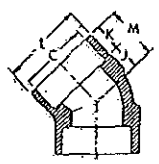
weights (lb each)

size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4
2000 lb													
90° elbow, fig. 2101	0.21	0.17	0.28	0.49	0.70	1.03	1.63	2.04	3.38	6.56	10.00	....	22.50
45° elbow, fig. 2102	0.18	0.14	0.23	0.45	0.59	0.90	1.40	1.65	2.63	7.63	12.00	....	19.75
tee, fig. 2103	0.28	0.26	0.34	0.69	0.95	1.35	2.10	2.75	4.25	9.06	13.50	....	32.50
cross, fig. 2104	0.59	0.50	0.40	0.80	1.05	1.65	2.35	3.28	5.00	17.20	22.10	....	38.60
3000 lb													
90° elbow, fig. 2111	0.21	0.31	0.60	0.91	1.43	2.28	2.88	4.88	5.44	10.00	17.13	37.12	29.25
45° elbow, fig. 2112	0.18	0.26	0.54	0.75	1.18	2.03	2.13	4.05	4.25	7.63	12.00	26.03	19.75
street elbow, fig. 2113	0.20	0.25	0.36	0.53	0.85	1.38	2.25	2.81	5.09	....	....	....	....
tee, fig. 2114	0.28	0.43	0.84	1.23	1.85	3.00	3.63	6.83	7.00	13.75	21.00	49.62	38.00
cross, fig. 2115	0.59	0.50	0.96	1.43	2.30	3.73	4.40	8.13	8.31	16.94	20.75	45.70	34.13
lateral, fig. 2116	....	1.10	1.06	0.93	1.50	2.62	2.94	4.50	8.25	....	....	....	....
coupling, fig. 2117	0.11	0.10	0.13	0.28	0.42	0.85	1.50	2.19	3.02	4.56	6.79	8.03	12.00
half coupling, fig. 2119	0.06	0.05	0.07	0.14	0.21	0.43	0.75	1.10	1.51	2.28	3.40	4.02	6.00
reducer, fig. 2118	0.11	0.10	0.13	0.28	0.42	0.85	1.50	2.19	3.02	4.56	6.79	8.03	12.00
cap, fig. 2120	0.08	0.09	0.11	0.24	0.39	0.72	1.32	1.54	2.34	4.05	5.84	7.09	10.08
6000 lb													
90° ell, fig. 2131	0.37	0.66	1.00	1.59	2.54	3.56	5.68	7.06	13.00	21.78	36.22	37.35	....
45° ell, fig. 2132	0.25	0.59	0.85	1.34	2.25	2.59	4.56	5.75	9.63	15.46	31.21	26.21	....
street elbow, fig. 2133	....	0.40	0.99	1.00	1.63	2.75	3.86	7.23	....	....	....	....	....
tee, fig. 2134	0.44	0.92	1.38	2.16	3.63	4.83	7.75	9.75	17.38	28.90	49.60	52.00	....
cross, fig. 2135	0.50	1.12	1.55	2.59	4.21	5.64	9.58	11.39	21.37	28.32	55.88	46.16	....
lateral, fig. 2136	....	1.31	1.18	1.84	4.10	4.23	5.62	11.84	....	....	....	....	....
coupling, fig. 2137	0.18	0.14	0.40	0.69	0.90	1.88	2.31	4.00	7.50	9.25	13.44	18.53	22.13
half coupling, fig. 2141	0.09	0.07	0.20	0.35	0.45	0.94	1.16	2.00	3.75	4.63	6.72	9.27	11.07
reducer, fig. 2138	0.18	0.14	0.40	0.69	0.90	1.88	2.31	4.00	7.50	9.25	13.44	18.53	22.13
cap, fig. 2143	0.13	0.13	0.19	0.31	0.44	0.75	1.31	1.69	3.25	....	....	....	....
plugs and bushings • 2000, 3000, 6000 lb													
plugs													
square head, fig. 2122	0.02	0.03	0.06	0.11	0.19	0.36	0.60	0.84	1.38	2.12	3.38	4.76	8.44
hex head, fig. 2142	0.03	0.06	0.10	0.16	0.30	0.55	1.03	1.36	2.29	3.81	4.75	8.37	13.00
round head, fig. 2121	0.05	0.10	0.16	0.26	0.43	0.74	1.21	1.58	3.11	4.88	7.19	10.34	13.25
hex bushing, fig. 2139	....	0.02	0.03	0.05	0.11	0.19	0.39	0.36	0.84	1.19	2.56	5.50	7.06
flush bushing, fig. 2140	....	0.03	0.03	0.06	0.07	0.12	0.14	0.14	0.34	0.45	1.18	1.35	1.70

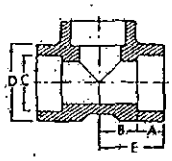
Conform to
USAS B16.11
ASTM A-181, Grade 1



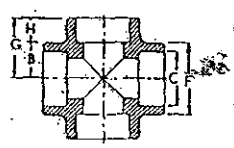
90° elbow



45° elbow



tee



cross

dimensions (inches)

size	⅛	¼	⅜	½	⅝	1	1¼	1½	2	2½	3	4
schedule 40 (3000 lb)												
A	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1 1/16	1⅛	1 5/16
B	3/16	¼	11/32	3/8	¾	⅜	1 1/16	1¼	1½	1⅝	2¼	2⅝
C	.420	.555	.690	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
D	⅜	⅜	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	3 5/16	4 5/16	5¼
E	1 5/16	1 5/16	1 3/32	1¼	1⅜	1½	1¾	2	2¾	3	3¾	4¾
F	⅞	⅞	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	4	4⅝	5¾
G	1 5/16	1 5/16	1 3/32	1⅛	1 3/16	1½	1¾	2	2¾	3¼	3¾	4¾
H	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1⅜	1¼	1 5/16
J	5/16	5/16	3/8	7/16	½	5/8	11/16	13/16	1	1¼	1¼	1 5/16
K	⅜	⅜	7/16	7/16	½	9/16	⅝	9/16	11/16	1 3/16	1¼	1½
L	⅞	⅞	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	4	4⅝	5¾
M	1 5/16	1 5/16	¾	⅞	1	1¾	1 5/8	1¾	1 13/16	2 5/16	2½	3⅜
N	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	⅞	1	1⅛
P	¾	⅞	1	1¼	1½	1¾	2¼	2½	3	3⅝	4¼	5½
Q	1	1	1⅛	1⅜	1½	1¾	1⅞	2	2½	2½	2¾	3
R	11/16	11/16	¾	⅞	1	1 1/16	1 5/16	1¼	1½	1½	1¾	1⅞
S	¼	¼	¼	3/8	⅜	½	½	½	¾	¾	¾	¾
schedule 80 (3000 lb)												
A	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1⅛	1¼	1 5/16
B	3/16	¼	11/32	3/8	¾	⅜	1 1/16	1¼	1½	1⅝	2¼	2⅝
C	.420	.555	.690	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
D	⅜	⅜	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	3 5/16	4 5/16	5¼
E	1 5/16	1 5/16	1 3/32	1¼	1 3/16	1½	1¾	2	2¾	3	3¾	4¾
F	⅞	⅞	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	4	4⅝	5¾
G	1 5/16	1 5/16	1 3/32	1⅛	1 3/16	1½	1¾	2	2¾	3¼	3¾	4¾
H	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	1⅜	1¼	1 5/16
J	5/16	5/16	3/8	7/16	½	5/8	11/16	13/16	1	1¼	1¼	1 5/16
K	⅜	⅜	7/16	7/16	½	9/16	⅝	9/16	11/16	1 3/16	1¼	1½
L	⅞	⅞	1	1 3/16	1½	1 5/16	2 5/16	2 7/16	2 23/32	4	4⅝	5¾
M	1 5/16	1 5/16	¾	⅞	1	1¾	1 5/8	1¾	1 13/16	2 5/16	2½	3⅜
N	⅜	⅜	7/16	½	9/16	⅝	11/16	¾	⅞	⅞	1	1⅛
P	¾	⅞	1	1¼	1½	1¾	2¼	2½	3	3⅝	4¼	5½
Q	1	1	1⅛	1⅜	1½	1¾	1⅞	2	2½	2½	2¾	3
R	11/16	11/16	¾	⅞	1	1 1/16	1 5/16	1¼	1½	1½	1¾	1⅞
S	¼	¼	¼	3/8	⅜	½	½	½	¾	¾	¾	¾

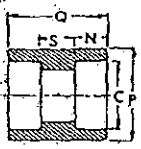
weights (lb each)

size	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	4
schedule 40 (3000 lb)												
90° elbow, fig. 2150	0.16	0.16	0.23	0.46	0.67	1.03	1.48	1.99	3.00	6.09	9.69	23.10
45° elbow, fig. 2151	0.11	0.11	0.19	0.41	0.55	0.84	1.34	1.56	2.50	7.41	10.38	19.69
tee, fig. 2152	0.23	0.18	0.31	0.68	0.85	1.34	2.05	2.73	4.21	8.16	12.00	29.60
cross, fig. 2153	0.47	0.40	0.32	0.80	0.99	1.67	2.40	3.20	5.18	13.10	19.90	33.20
coupling, fig. 2154	0.09	0.11	0.14	0.28	0.41	0.58	1.04	1.25	2.03	3.01	3.97	7.10
half coupling, fig. 2155	0.09	0.11	0.14	0.28	0.41	0.58	1.04	1.25	2.03	3.01	3.97	7.10
reducer, fig. 2156	0.09	0.11	0.14	0.28	0.41	0.58	1.04	1.25	2.03	3.01	3.97	7.10
cap, fig. 2157	0.07	0.09	0.12	0.22	0.36	0.48	0.91	1.12	1.88	2.74	4.27	7.40
schedule 80 (3000 lb)												
90° elbow, fig. 2160	0.20	0.16	0.25	0.48	0.68	1.00	1.59	2.13	3.78	6.74	10.94	24.13
45° elbow, fig. 2161	0.15	0.13	0.20	0.43	0.58	0.89	1.40	1.70	2.69	7.88	11.25	20.75
tee, fig. 2162	0.24	0.19	0.33	0.71	0.87	1.44	2.19	2.98	4.57	8.60	13.00	31.30
cross, fig. 2163	0.49	0.45	0.34	0.83	1.03	1.68	2.56	3.46	5.60	13.70	21.10	35.00
coupling, fig. 2164	0.09	0.11	0.16	0.29	0.42	0.59	1.07	1.30	2.13	3.14	4.14	7.30
half coupling, fig. 2165	0.09	0.11	0.16	0.29	0.42	0.59	1.07	1.30	2.13	3.14	4.14	7.30
reducer, fig. 2166	0.09	0.11	0.16	0.29	0.42	0.59	1.07	1.30	2.13	3.14	4.14	7.30
cap, fig. 2167	0.07	0.09	0.12	0.22	0.36	0.48	0.91	1.12	1.88	2.74	4.27	7.40

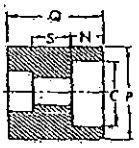
forged steel socket welding

pressure ratings, psi (non-shock)

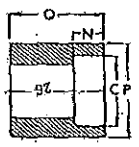
schedule	40	80	160	XXH
cold water, oil, gas, air	2000	3000	4000	6000
900° F steam, hot oil, vapor	615	925	1235	1855



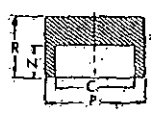
coupling



reducer



half coupling



cap

dimensions (inches)

size	½	¾	1	1¼	1½	2	2½	3	4
schedule 160 (6000 lb)									
A	5/16	3/8	11/16	3/4	7/8	7/8	1	1 1/4	1 1/16
B	3/4	7/8	1 1/16	1 1/4	1 1/2	1 3/8	2 1/4	2 1/2	2 3/4
C	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
D	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 3/4	5 1/4
E	1 3/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 3/16
F	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 5/16	5 1/4
G	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 3/16
H	3/16	5/16	11/16	3/4	7/8	7/8	1	7/8	1 1/16
J	1/2	5/8	11/16	13/16	1	1 1/4	1 1/4	1 3/8	1 3/8
K	1/2	5/8	5/8	5/8	13/16	15/32	13/16	1 1/2	1 1/2
L	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 5/16	5 1/4
M	1	1 1/16	1 5/16	1 3/8	1 13/16	1 29/32	2 1/16	2 1/2	3 1/16
N	1/2	5/16	5/8	11/16	3/4	7/8	7/8	1	1 1/16
P	1 1/2	1 3/4	2 1/4	2 1/2	3	3 3/4	4 1/4	4 3/4	6 1/4
Q	1 3/8	1 1/2	1 3/4	1 7/8	2	2 1/2	2 1/2	2 3/4	3
R	1	1 1/16	1 1/4	1 5/16	1 3/8	1 5/8	1 5/8	1 7/8	2 1/16
S	3/8	3/4	1/2	1/2	1/2	3/4	3/4	3/4	3/4
double extra heavy (6000 lb)									
A	11/16	3/4	7/8	15/16	1 1/8	1	1 1/2	1 5/8	1 3/4
B	3/4	3/4	7/8	1 1/4	1 1/4	1 1/2	1 3/4	2 1/8	2 3/4
C	.855	1.065	1.330	1.675	1.915	2.406	2.906	3.535	4.545
D	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 3/4	5 1/4
E	1 3/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 3/16
F	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 5/16	5 1/4
G	1 5/16	1 1/2	1 3/4	2	2 3/16	2 1/2	3 1/4	3 3/4	4 3/16
H	11/16	3/4	7/8	15/16	1 1/8	1	1 1/2	1 1/4	1 3/4
J	3/8	3/4	1/2	5/8	13/32	7/8	1	1 1/2	1 1/2
K	5/8	11/16	15/16	3/4	1 13/32	17/32	1 1/16	1 1/4	1 1/2
L	1 1/2	1 13/16	2 3/16	2 1/16	2 31/32	3 3/16	4	4 5/16	5 1/4
M	1	1 1/16	1 5/16	1 3/8	1 13/16	1 29/32	2 1/16	2 1/2	3 1/16
N	1/2	5/16	5/8	11/16	3/4	7/8	7/8	1	1 1/16
P	1 1/2	1 3/4	2 1/4	2 1/2	3	3 3/8	4 1/2	5	6 1/2
Q	1 3/8	1 1/2	1 3/4	1 7/8	2	2 1/2	2 1/2	2 3/4	3
R	1	1 1/16	1 1/4	1 5/16	1 3/8	1 5/8	1 5/8	1 7/8	2 1/16
S	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	3/4

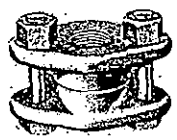
weights (lb each)

size	½	¾	1	1¼	1½	2	2½	3	4
schedule 160 (6000 lb)									
90° elbow, fig. 2170	0.88	1.37	2.25	2.91	5.22	6.00	11.81	18.58	28.80
45° elbow, fig. 2171	0.68	1.14	2.03	2.25	4.22	5.03	8.88	12.76	23.45
tee, fig. 2172	1.16	1.94	3.17	3.95	7.13	7.72	15.30	23.10	34.90
cross, fig. 2173	1.38	2.29	3.75	4.65	8.70	9.30	18.10	24.10	38.80
coupling, fig. 2174	0.51	0.70	1.40	1.59	2.58	4.58	6.14	7.10	13.70
half coupling, fig. 2175	0.51	0.70	1.40	1.59	2.58	4.58	6.14	7.10	13.70
reducer, fig. 2176	0.51	0.70	1.40	1.59	2.58	4.58	6.14	7.10	13.70
cap, fig. 2177	0.42	0.58	1.16	1.40	2.14	3.62	4.90	7.60	13.30
double extra heavy (6000 lb)									
90° elbow, fig. 2180	0.88	1.38	2.63	3.00	5.31	6.00	10.47	18.84	31.54
45° elbow, fig. 2181	0.66	1.26	1.95	2.45	4.44	4.73	8.83	13.28	24.62
tee, fig. 2182	1.18	1.95	3.17	4.07	7.21	7.94	15.30	23.40	37.30
cross, fig. 2183	1.52	2.31	3.75	4.73	8.74	9.50	17.90	24.10	41.50
coupling, fig. 2184	0.52	0.72	1.43	1.65	2.64	4.68	6.30	8.85	14.00
half coupling, fig. 2185	0.52	0.72	1.43	1.65	2.64	4.68	6.30	8.85	14.00
reducer, fig. 2186	0.52	0.72	1.43	1.65	2.64	4.68	6.30	8.85	14.00
cap, fig. 2187	0.42	0.58	1.16	1.40	2.14	3.62	4.90	7.60	13.30

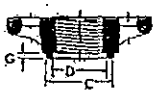
W-S tongue and groove flange

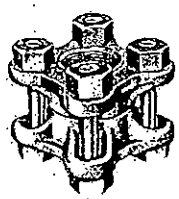
3000 lb O.W.G. cold non-shock

threaded

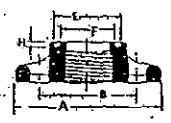


2-bolt
fig. 2123

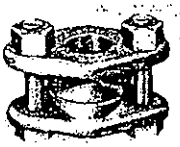




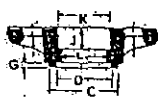
4-bolt
fig. 2124

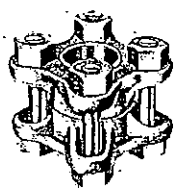


socket weld

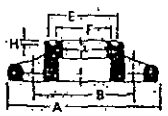


2-bolt
fig. 2168





4-bolt
fig. 2188



dimensions (inches) • weights

nom pipe size	outside size of flange A	diam. bolt circle B	O.D. tongue C	I.D. tongue D	O.D. groove E	I.D. groove F	height of tongue G	depth of groove H	depth of socket J	bore for O.D. of pipe K	bore for I.D. of pipe L	face to face closed	studs diam.	studs length	weight (approx) lb., each
2-bolt oval															
¼	3½	2¼	1 3/32	23/32	1⅛	⅞	3/32	⅛	⅜	.555	29/64	1⅜	½	3	2.00
⅜	3⅝	2⅝	1 23/32	1 3/32	1¼	1¼	3/32	⅛	7/16	.690	½	1⅞	½	3¼	2.81
½	3¾	2⅝	1 23/32	1 3/32	1¼	1¼	3/32	⅛	½	.855	5/8	1¾	½	3¼	2.56
¾	4¼	2¾	1 29/32	1 13/32	1 5/16	1 5/16	3/32	1/16	5/8	1.065	11/16	2⅛	⅝	3¼	3.50
1	4⅝	3⅛	2 3/32	1 13/32	2¼	1⅝	3/32	¼	¾	1.330	1¼	2⅛	⅝	3¼	4.00
4-bolt square															
1	3½	3 1/16	2 3/32	1 13/32	2 1/16	1 5/16	3/32	⅛	⅝	1.330	1¼	2⅛	½	3¼	4.38
1¼	3¾	3 3/4	2 3/32	1 29/32	2 5/16	1 13/16	3/32	⅛	11/16	1.675	1¾	2⅜	⅝	3¾	5.75
1½	4	3 15/32	2¾	2⅛	2 15/32	2 5/32	3/32	⅛	¾	1.915	1⅞	2⅜	⅝	3¾	6.38
2	4 11/16	4 1/4	3¼	2½	3 3/32	2 15/32	3/32	¼	⅞	2.406	2 1/16	2¾	⅝	4¼	8.31

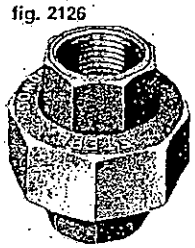
Flange unions are furnished with alloy steel studs, and nuts and with compressed asbestos gaskets. Gaskets are suitable for all services with temperature-pressure combinations developed in connection with oil and all refrigerants, steam, water, gasoline, ammonia, acids, alkalies and volatile vapors.

nut type, machined seat

3000 lb. O.W.G. cold non-shock (925 lb non-shock steam, hot oil or vapor at 900°F)

threaded
fig. 2125

socket weld:
fig. 2126



material: carbon steel ASTM A-105 grade 2

threads: tapered USAS B2.1

nuts: cadmium plated inside and outside

seats: steel-to-steel with spherical-to-angle mating surfaces which provide positive seating

dimensions (inches) • weights

pipe size	length end to end	diameter across flats of nut	socket diameter	socket depth	weight (approx) lb., each
⅛	1 3/32	1⅜	.420	⅜	.38
¼	1 23/32	1⅜	.555	¾	.36
⅜	1 23/32	1⅝	.690	¾	.48
½	1 29/32	1 13/16	.855	½	.68
¾	2 3/32	2 1/32	1.065	5/8	1.18
1	2½	2⅜	1.330	⅝	1.68
1¼	2 13/16	3⅛	1.675	11/16	2.54
1½	3⅛	3⅜	1.915	¾	3.27
2	3¼	4 1/32	2.406	⅞	5.11
2½	4¼	4⅞	2.906	1	8.55
3	4 3/32	5¼	3.535	1⅛	12.75

forged steel unions

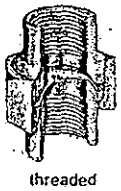
3000 lb O.W.G. cold non-shock (1000 psi @ 900°F)

ground joint: sizes ⅛ to 3-inch

threaded — also socket weld

male and female — also socket weld

orifice: sizes ¾ to 3-inch



threaded — also socket weld and male and female

specify

material: carbon steel ASTM A105 grade 2 unless otherwise ordered; also available in chrome-moly, 18-8 stainless steel, Monel.

seats: steel to steel unless otherwise ordered; also available in bronze to steel, stainless steel to steel, "O" Ring, orifice.

orifice plates: carbon steel or stainless steel

orifice holes: fractional—thru 1.000 inch; M/M—thru 12.5; wire—No. 80 thru No. 1; Micro—.006 thru .012.

coupling (nut) threads: furnished with either U. S. Standard V-threads or Coarse Acme threads; Double-Start Acme threads (for faster nut opening and closing) available in 2, 2½ and 3 inch sizes.

lug nuts: furnished on special order, with Acme threads only, limited sizes.

finish: black or cadmium plated

ends: threaded both ends; socket weld both ends; male and female threaded; female socket, male threaded. Socket weld ends are available in schedule 40, ⅜ thru 3 inch; schedule 80, ¼ thru 2 inch.

6000 lb O.W.G. cold non-shock (1500 psi @ 1200°F)

specify

material: carbon steel ASTM A105 grade 2 unless ordered otherwise.

seats: steel to steel; stainless steel to steel; orifice (¾ to 3 inch only).

orifice plates: carbon steel or stainless steel

orifice holes: fractional—thru 1.000 inch; M/M—thru 12.5; wire—No. 80 thru No. 1; Micro—.006 thru .012.

coupling (nut) threads: furnished in V-threads only.

lug nuts: furnished on special order, with Acme threads only, limited sizes.

finish: black or cadmium plated

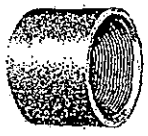
ends: threaded both ends; socket weld both ends. Socket welding ends are available in schedule 40—⅛, ¼, ⅜, 1½, 2 inch; schedule 80—⅛, ¼, ⅜ inch; schedule 160 and XXH—¾ thru 1¼ inch.

dimensions (inches) • weights

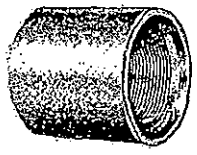
pipe size	length end to end: female both ends	length end to end: male and female	diam. across flats of nuts	welding socket: diameter	welding socket: depth	weight (approx) lb., each: ground joint: female both ends	ground joint: male-female	orifice: female	orifice: male-female
3000 lb									
⅛	2	2½	1⅜	.420	⅜	.31	.38	....	.38
¼	2	2½	1⅜	.555	⅜	.31	.38	....	.38
⅜	2⅜	2¾	1⅝	.690	⅜	.44	.50	.56	.50
½	2⅜	2⅝	1¾	.855	½	.63	.81	.75	.81
¾	2⅝	3⅛	2⅛	1.065	⅝	1.00	1.13	1.19	1.13
1	2¾	3⅜	2⅜	1.330	⅝	1.31	1.56	1.50	1.56
1¼	2⅞	4	2¾	1.675	⅞	1.75	2.38	2.00	2.38
1½	3⅛	4⅜	2⅞	1.915	¾	2.38	3.00	2.63	3.00
2	3⅜	4⅝	3⅛	2.406	⅞	3.88	4.69	4.19	4.69
2½	3⅞	5⅛	4½	2.906	⅞	6.13	7.13	6.44	7.13
3	4½	5¾	5⅜	3.535	1	11.63	14.25	12.00	14.25
6000 lb									
⅛	2	...	1⅜	.420	⅜	.50	....	.50	.....
¼	2	...	1⅜	.555	⅜	.56	....	.56	....
⅜	2⅜	...	1¼	.690	⅜	.75	....	.75	....
½	2½	...	2⅛	.855	½	1.31	....	1.31	....
¾	2⅝	...	2⅝	1.065	⅝	1.94	....	1.94	....
1	3⅛	...	3	1.330	⅝	2.88	....	2.88	....
1¼	3⅝	...	3⅜	1.675	⅞	3.38	....	3.38	....
1½	3¾	...	4⅛	1.915	¾	6.00	....	6.00	....
2	4	...	4½	2.406	⅞	7.38	....	7.38	....

steel couplings
black or galvanized

standard merchant +
fig. 336



extra heavy⊙
fig. 337



+ Standard merchant couplings are available either straight tapped (sizes ⅛ to 4 inch) or taper tapped (sizes ¼ to 6 inch). Unless otherwise ordered, couplings will be furnished to Iron and Steel Institute (AISI) specifications which require straight tapping in sizes ⅛ to 2 inch, taper tapping in sizes 2½ inch and larger.

Taper tapping is ¾ inch per foot on the diameter.

♪ Standard merchant couplings are not available in sizes over 6 inch. Specify either API line pipe or extra heavy couplings.

⊙ Extra heavy couplings are available recessed in all sizes, non recessed in sizes ¼ to 6 inch; taper tapped in all sizes, straight tapped in sizes ⅛ to 1½ inch. Unless otherwise ordered, couplings will be furnished non recessed and taper tapped in sizes to 6 inch. Straight tapped extra heavy couplings are not AISI standards.

Right and left hand couplings are available in sizes ⅛ to 3 inch both standard merchant and extra heavy. All sizes are taper tapped. Left hand thread end of coupling identified by knurl. Extra heavy couplings are not recessed.

		standard merchant: fig. 336+			extra heavy: fig. 337⊙			
size in.	threads per inch	outside diam., in.	length in.	weight (approx.), lbs. per 100	outside diam., in.	length in.	weight (approx.) lbs. per 100 recessed	weight (approx.) lbs. per 100 non-rec
⅛	27	.563	1/16	3	.563	1¼	4	4
¼	18	.719	1¾	7	.719	1⅜	9	9
⅜	18	.875	1¾	9	.875	1¾	13	14
½	14	1.063	1¾	17	1.063	2⅛	24	25
¾	14	1.313	1¾	26	1.313	2¼	34	36
1	11½	1.576	2	40	1.660	2⅜	54	74
1¼	11½	1.900	2⅛	48	2.054	2¾	103	108
1½	11½	2.200	2¼	67	2.200	2¾	90	95
2	11½	2.750	2¼	105	2.875	2¾	186	201
2½	8	3.250	3⅛	209	3.375	4¼	327	353
3	8	4.000	3¼	335	4.000	4¼	409	461
3½	8	4.625	3⅜	482	4.625	4⅜	592	625
4	8	5.000	3½	461	5.200	4½	759	788
5	8	6.296	3¾	852	6.296	4⅝	998	1050
6	8	7.390	4	1127	7.390	4⅞	1292	1451
8	8	♪	♪	♪	9.625	5¼	2318	.....
10	8	♪	♪	♪	11.750	5¾	3155	.....
12	8	♪	♪	♪	14.000	6¼	4927	.....

steel pipe nipples

standard, *black:* fig. 339
standard, *galvanized:* fig. 343
extra strong, *black or galv.:* fig. 338

close

short or long

locknut or tank nipple
standard: fig. 341-A

Locknut or tank nipples are available in standard weight sizes ¼ to 3 inch, in 6 inch length only, black or galvanized. Tank nipples have standard taper pipe thread on one end; the other end has standard taper size thread running into American Standard locknut thread for total thread length of 4 inches.

Unless otherwise specified welded nipples ASTM A-120 are furnished on orders for steel nipples in standard and extra strong sizes ¼ to 6 inch; seamless nipples ASTM A-53 are furnished on orders for steel nipples in standard and extra strong sizes 8, 10 and 12 inch and in double extra strong sizes 2 to 6 inch.

Welded steel nipples (ASTM A-120) are available in standard and extra strong sizes ⅛ to 6 inch, right hand threads, black or galvanized.

Seamless steel nipples (ASTM A-53) are available in standard, extra strong sizes 2 to 12 inch, double extra strong sizes 2 to 6 inch, with right hand threads, black only.

Seamless steel nipples (ASTM A-106) are available in standard, extra strong and double strong sizes 2 to 4 inch.

Seamless steel pressure tube nipples (ASTM A-106) are available in standard and extra strong sizes ⅛ to 1½ inch IPS, double extra strong sizes ½ to 1½ inch IPS, with right hand threads, black only.

Right and left steel nipples are available in standard weight sizes ¾ to 2 inch, in 4 inch length only, black only.
Butt or blind steel nipples are available in standard weight, black.

Genuine wrought iron nipples are available in standard and extra strong weights, black or galvanized.

Nipples are available from stock in ⅛ through 12 inch diameter, close to 24 inch in length.

joint compounds

Grinnell sprinkler for general use on air, water and steam lines

fig. 1698

This compound was originally developed for Grinnell automatic sprinkler system piping and after years of satisfactory results it was offered for sale and recommended as the highest quality material for use on air, water, gas and low pressure steam installations.

It is an efficient thread lubricant, steel gray in color, having the property of quick drying on the surface with the minimum tendency to drip from the face of the fittings after completion of make-up work. This contributes to a clean overhead installation and makes it easier to apply paint to the piping without danger of altering the color of the paint. Furnished in 1½ lb. pint and 3 lb. quart containers.Ⓔ

Grinnell stainless for general use where staining must be avoided

fig. 1699

Grinnell Stainless Pipe Joint Cement is a stainless, semi-fluid mixture of a neutral color possessing a high lubricating value and providing an elastic seal. It can be applied as a paint and is not affected by moisture, heat, acids or alkalies.

Recommended for general service purposes where staining must be avoided and is especially adapted to domestic heating, plumbing and miscellaneous pipe connection services handling air, water, gas and low pressure steam. Furnished in 1½ lb. pint and 3 lb. quart containers.Ⓔ

Grinnell graphite base for general power and heavy industrial piping

fig. 1700

Grinnell Graphite Base Pipe Joint Compound is a semi-fluid, penetrating, black mixture, free from lead compounds, an excellent lubricant for threaded pipe joints.

Suitable for general power piping and heavy industrial work. Especially recommended for high temperature work and where a closely adhering coating is desired.

The penetrating properties of the graphite in this compound are difficult to control and it should not be used where it might come in contact with valuable interior finish or when the completed piping is to be finished with light colored paint. Furnished in 1¼-lb pint and 2½-lb quart containers.Ⓔ

Grinnell-Fields for general use on air, water, oil, steam or gas lines

fig. 1640

Grinnell-Fields Pipe Joint Compound has been constantly and successfully used throughout the country for over [illegible] years.

As a standard all-around heavy-bodied lubricant for threaded pipe joints this compound needs no introducton to the trade. It has proved its worth for general use on air, water, oil, steam and gas lines. Dark brown in color, it is composed of a lead base and quality oils—dries quickly and forms a flexible seal capable of withstanding hard usage. Furnished in 2½ lb. pint and 5 lb. quart containers.Ⓔ

Grinnell Sure-Seal for lines conveying anti-freeze compounds.

fig. 1697

Grinnell Sure-Seal Pipe Joint Compound is a non-drying, acid and alkali resisting compound. It is especially recommended for use in making up threaded joints in lines installed to convey Grinnell anti-freeze, Glycol mixtures, calcium chloride brine and glycerine solutions. It is satisfactory for use at high as well as low temperatures. Furnished in 1½-lb pint and 3-lb quart containers.Ⓔ

Grinnell thread-cutting oil all purpose lubricant for hand tools and power-driven machines.

fig. 1695

Grinnell Thread Cutting Oil is an all purpose lubricant free from animal or vegetable compounds and is produced to meet rigid standards involving a complete series of analytical tests. Constant uniformity is guaranteed.

This cutting oil prolongs the life of expensive threading equipment and is just as efficient with hand tools as with power-driven machines. It has a low viscosity and mild mineral type odor, flows freely at low temperatures and, being non-drying, eliminates gummy deposits. Elements in oil never settle, and despite its unusual lubricating qualities, the cost per gallon or per unit threaded is low.

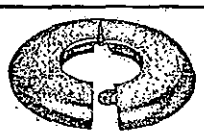
Furnished in 1 and 5-gallon cans; also in 30 and 55-gallon steel drums. Prices on application.

Ⓔ Whenever possible, Grinnell joint compound should be ordered in cases of either 12 or 24 pint or quart containers. Compounds are not available in bulk.

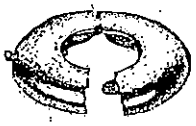
floor and ceiling plates

stamped steel
hinged

with springs
for copper tube: fig. 1
for pipe: fig. 10



with set screw
for copper tube: fig. 2
for pipe: fig. 13

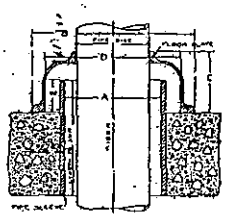


with springs and exposed rivet hinge
for pipe: fig. 20

nominal size in.	to fit copper tube figs. 1 and 2		to fit pipe size figs. 10 and 13		fig. 20	
	outside dia., in.	wgt. lbs. per doz.	outside dia., in.	wgt. lbs. per doz.	outside dia., in.	wgt. lbs. per doz.
¼	2⅛□	.88□	2⅜	.69	....	....
⅜	2⅛	.69	2½	.81	2½	.88
½	2⅜	.81	2⅝	.94	2⅝	.88
¾	2²⁵⁄₃₂	.94	2²⁵⁄₃₂	1.00	2²⁵⁄₃₂	.94
1	2²⁵⁄₃₂	1.06	3½	1.38	3½	1.25
1¼	3½	1.38	3⅝	1.63	3⅝	1.38
1½	3⅝	1.63	3¹³⁄₁₆	1.69	3¹³⁄₁₆	1.63
2	4⅛	2.13	4⅜	2.25	4⅜	2.25
2½	4⅞	2.75	5²⁵⁄₃₂	2.88	5¼	2.81
3	5⅜	2.81	5²⁵⁄₃₂	3.38	5⅞	3.31
3½	....	....	6⅛	4.00	6¼	4.06
4	....	....	7⅛	4.56	7⅛	4.38
5	....	....	8⅛	9.00	....	....
6	....	....	10	10.50	....	....

special concrete floor plate

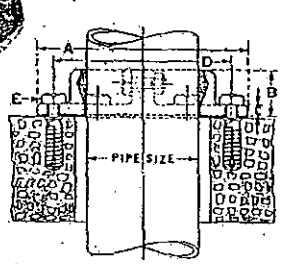
fig. 400



size, in.	A in.	B in.	C in.	D in.	weight (approx.) each, lb. black	galv.
½	1¼	4	3½	2½	1.88	•
¾	1½	4¼	3½	2¾	2.08	•
1	2	4⅝	3½	3⅛	2.48	•
1¼	2½	5½	3½	4	3.28	•
1½	2½	5½	3½	4	3.36	•
2	3	6	3½	4½	3.88	•
2½	3½	6½	3½	5	4.00	•
3	4	7	3¾	5¼	5.50	•
3½	5	8⅛	3¾	6⅛	7.47	•
4	6	10¼	3¾	8½	9.07	•
5	7	11⅛	3¾	9⅝	11.13	•
6	8	12	3¾	10¼	10.20	•
8	10	14¼	3¾	12½	16.60	•
10	12	16⅛	3¾	14⅛	....	•

water-tight riser sleeve

fig. 405



B: 2⅝ in.
C: ⅝ in.
} for all sizes

pipe size, in.	diameter A, in.	width A, in.	bolt circle D, in.	no. of bolts	screw sizes E, in.	wgt. (approx) each, lb.
2	8⅛	6½	6⅛	4	⅝	13.10
2½	8⅞	6⅝	6⅞	4	⅝	13.50
3	9½	7⅛	7⅛	4	⅝	15.30
3½	10	7⅛	8	4	⅝	15.50
4	10½	....	8½	6	⅝	18.90
5	11⅝	....	9⅝	6	⅝	21.30
6	12⅝	....	10⅝	6	⅝	23.90
8	14⅝	....	12⅝	6	⅝	32.00

4 to 8-inch, round flanges; 2 to 3½-inch, flanges cut off on opposite sides.

Grinnell watertight riser sleeve is installed around sprinkler risers or other vertical pipes to prevent water from flowing to floors below. As this sleeve itself does not hold pipe firmly, any movement — due to settling, expansion or contraction — does not interfere with tightness of joint.

Riser sleeve is cast in two parts and provided with recess similar to bell of cast iron bell and spigot pipe. Recess should be packed with oakum or other suitable material.

Moderately soft gasket, furnished, is placed between flange and floor with grouting of roofers' cement. Sleeve secured to concrete floor with expansion bolts; to wood floor with coach screws.

□ ¼ inch for copper tube made only in fig. 2.
• Not stocked

cartons

malleable iron fittings

standard (black or galvanized)

90° elbow: fig. 1101 *(page pf-2)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅛	420	30	12	35	2.4
¼	360	45	12	30	3.8
⅜	240	43	8	30	5.1
½	200	51	4	50	12.5
¾	140	59	4	35	14.5
1	80	54	4	20	13.3
1¼	60	62	3	20	20.3
1½	48	68	4	12	16.5
2	24	52	3	8	16.7

90° elbow reducing: fig. 1101R *(page pf-2)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
¼ x ⅛	400	41	8	50	4.7
⅜ x ¼	200	33	8	25	3.9
⅜ x ¼	300	40	12	25	3.3
½ x ⅜	200	46	4	50	11.3
½ x ¼	240	48	8	30	5.9
¾ x ½	120	44	4	30	10.8
¾ x ⅜	120	39	4	30	9.5
¾ x ¼	200	56	8	25	7.1
1 x ¾	80	48	4	20	11.5
1 x ½	100	45	4	25	11.0
1 x ⅜	100	44	4	25	10.8
1¼ x 1	60	51	6	10	8.3
1¼ x ¾	60	44	4	15	10.8
1¼ x ½	80	53	4	20	13.0
1½ x 1¼	48	55	4	12	13.5
1½ x 1	48	47	4	12	11.5
1½ x ¾	48	44	4	12	10.8
2 x 1½	40	70	4	10	17.0
2 x 1¼	40	69	4	10	16.7
2 x 1	36	54	3	12	17.7
2 x ¾	40	55	4	10	13.5

45° elbow: fig. 1102 *(page pf-2)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅛	600	46	12	50	3.5
¼	280	32	8	35	3.8
⅜	320	52	8	40	6.4
½	200	47	4	50	11.3
¾	160	58	4	40	14.3
1	100	59	4	25	14.5
1¼	60	54	4	15	13.3
1½	48	61	4	12	14.8
2	32	62	4	8	15.3

90° street elbow: fig. 1103 *(page pf-3)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅛	480	33	12	40	2.7
¼	360	43	12	30	3.5
⅜	240	45	8	30	5.5
½	200	50	4	50	12.0
¾	160	66	4	40	16.2
1	100	66	4	25	16.0
1¼	60	69	4	15	17.0
1½	48	73	4	12	18.0
2	24	58	3	8	19.0

90° street elbow, reducing: fig. 1103R *(page pf-3)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
½ x ⅜	200	51	4	50	12.5
¾ x ½	140	50	4	35	12.2
1 x ¾	100	59	4	25	14.3
1¼ x 1	80	74	4	20	18.0
1¼ x ¾	100	81	4	25	19.8
1½ x 1¼	48	61	3	16	19.8
1½ x 1	40	46	4	10	11.3
1½ x ¾	40	41	4	10	10.0
2 x 1½	30	58	3	10	19.0

45° street elbow: fig. 1104 *(page pf-3)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅛	600	40	12	50	3.3
¼	400	42	8	50	5.1
⅜	400	62	8	50	7.6
½	200	45	4	50	11.0
¾	160	57	4	40	14.0
1	100	58	4	25	14.3
1¼	60	54	4	15	13.3
1½	60	77	4	15	19.0
2	30	62	3	10	20.3

plain side outlet elbow: fig. 1109 *(page pf-9)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅜	240	51	8	30	6.0
½	120	38	4	30	9.0
¾	120	62	4	30	15.0
1	80	63	4	20	15.3
1¼	36	44	3	12	14.0
1½	30	48	3	10	14.8
2	20	50	4	5	11.8

tee: fig. 1105 *(page pf-3)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
⅛	420	42	12	35	3.3
¼	280	48	8	35	5.5
⅜	240	58	8	30	7.1
½	160	57	4	40	13.8
¾	105	61	3	35	20.0
1	80	76	4	20	18.7
1¼	45	67	3	15	21.8
1½	30	59	3	10	19.2
2	20	58	2	10	28.5

tee, reducing: fig. 1105R *(page pf-4)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
¼ x ¼ x ⅛	400	55	8	50	6.8
⅛ x ⅛ x ¼	400	51	8	50	6.3
⅜ x ⅜ x ¼	240	55	8	30	6.7
⅜ x ¼ x ⅜	240	55	8	30	6.8
⅜ x ¼ x ½	280	57	8	35	7.0
¼ x ¼ x ⅜	280	55	8	35	6.8
½ x ½ x ⅜	140	46	4	35	11.3
½ x ½ x ¼	200	60	8	25	7.4

▲ Weights are for black fittings.

malleable iron fittings *(continued)*

standard *(black or galvanized)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
tee, reducing: fig. 1105R *(continued)*					
½ x ¾ x ½	160	55	8	20	6.7
½ x ¾ x ¾	160	48	8	20	5.9
½ x ¼ x ½	160	50	8	20	6.1
¾ x ¾ x ½	160	48	8	20	5.9
¾ x ¾ x ½	140	71	4	35	17.3
¾ x ¾ x ¾	120	56	4	30	13.6
¾ x ¾ x ¼	100	43	4	25	10.3
¾ x ½ x ¾	140	73	4	35	17.5
¾ x ½ x ½	140	67	4	35	16.3
¾ x ¾ x ¾	100	48	4	25	11.8
¾ x ¾ x ⅜	140	53	4	35	13.0
¾ x ¼ x ¾	120	55	4	30	13.5
½ x ½ x ¾	120	54	4	30	13.3
1 x 1 x ¾	75	58	3	25	19.0
1 x 1 x ½	60	44	4	15	10.7
1 x 1 x ⅜	80	52	4	20	12.8
1 x 1 x ¼	80	48	4	20	11.6
1 x ¾ x 1	80	64	4	20	15.5
1 x ¾ x ¾	80	52	4	20	12.8
1 x ¾ x ½	80	49	4	20	12.0
1 x ½ x 1	80	61	4	20	14.8
1 x ½ x ¾	80	52	4	20	12.8
1 x ½ x ½	100	56	4	25	13.8
1 x ¼ x 1	80	59	4	20	14.3
¾ x ¾ x 1	80	56	4	20	13.8
½ x ½ x 1	100	58	4	25	14.3
1¼ x 1¼ x 1	42	51	3	14	16.7
1¼ x 1¼ x ¾	48	50	4	12	12.3
1¼ x 1¼ x ½	60	59	4	15	14.5
1¼ x 1¼ x ⅜	60	54	4	15	13.3
1¼ x 1 x 1¼	40	49	4	10	12.0
1¼ x 1 x 1	56	59	4	14	14.5
1¼ x 1 x ¾	60	55	4	15	13.5
1¼ x 1 x ½	60	52	4	15	12.8
1¼ x ¾ x 1¼	40	47	4	10	11.5
1¼ x ¾ x 1	60	60	4	15	14.8
1¼ x ¾ x ¾	60	52	4	15	12.8
1¼ x ½ x 1¼	40	45	4	10	11.0
1¼ x ½ x 1	60	59	4	15	14.3
1 x 1 x 1¼	60	64	4	15	15.8
¾ x ¾ x 1¼	60	58	4	15	14.3
1½ x 1½ x 1¼	32	52	4	8	12.8
1½ x 1½ x 1	40	64	4	10	15.6
1½ x 1½ x ¾	40	57	4	10	13.8
1½ x 1½ x ½	32	40	4	8	9.6
1½ x 1¼ x 1½	30	50	3	10	16.3
1½ x 1¼ x 1¼	30	47	3	10	15.0
1½ x 1¼ x 1	48	64	4	12	15.5
1½ x 1¼ x ¾	48	57	4	12	13.8
1½ x 1¼ x ½	40	47	4	10	11.3
1½ x 1 x 1½	36	57	3	12	18.3
1½ x 1 x 1¼	36	51	3	12	16.5
1½ x 1 x 1	48	60	4	12	14.5
1½ x ¾ x 1½	36	56	3	12	18.2
1½ x ½ x 1½	36	52	3	12	16.8
1¼ x 1¼ x 1½	36	56	3	12	18.0

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
tee, reducing: fig. 1105R *(continued)*					
1 x 1 x 1½	48	62	4	12	15.0
2 x 2 x 1½	24	56	3	8	19.0
2 x 2 x 1¼	24	57	3	8	18.5
2 x 2 x 1	30	64	3	10	20.7
2 x 2 x ¾	30	56	3	10	18.0
2 x 2 x ½	36	62	3	12	20.3
2 x 1½ x 2	18	46	3	6	15.0
2 x 1½ x 1½	24	53	3	8	17.3
2 x 1½ x 1¼	24	47	3	8	15.3
2 x 1½ x 1	30	52	3	10	16.7
2 x 1¼ x 2	24	58	3	8	19.0
2 x 1¼ x 1½	24	49	3	8	15.8
2 x 1¼ x 1¼	24	46	3	8	14.8
2 x 1 x 2	24	55	3	8	17.8
2 x ¾ x 2	24	54	3	8	17.3
2 x ½ x 2	24	59	3	8	19.2
1½ x 1½ x 2	30	63	3	10	20.5
1¼ x 1¼ x 2	30	57	3	10	18.3
1 x 1 x 2	30	53	3	10	17.0
street tee: fig. 1106 *(page pf-6)*					
¼	400	62	8	50	7.6
⅜	200	51	8	25	6.3
½	100	40	4	25	9.8
¾	100	65	4	25	16.0
1	60	60	4	15	14.8
1¼	40	61	4	10	15.0
1½	30	62	3	10	20.3
2	16	55	2	8	27.0
street tee, reducing: fig. 1106R *(page pf-6)*					
1 x 1 x 1½	48	60	4	12	14.6
1 x 1 x ¾	80	67	4	20	16.3
1¼ x 1 x 1¼	48	68	4	12	16.5
1¼ x 1 x 1	48	55	4	12	13.3
1¼ x ¾ x 1¼	48	58	4	12	14.3
1½ x 1¼ x 1½	30	59	3	10	19.0
1½ x 1 x 1½	30	52	3	10	16.7
2 x 2 x 1	16	34	2	8	16.0
2 x 1½ x 2	18	55	2	9	27.0
plain side outlet tee: fig. 1113 *(page pf-9)*					
⅜	200	50	8	25	6.0
½	120	47	4	30	11.3
¾	80	49	4	20	11.7
1	40	38	4	10	9.0
1¼	30	43	3	10	13.9
1½	24	45	3	8	14.5
2	20	58	4	5	14.0
cross: fig. 1107 *(page pf-6)*					
⅛	400	52	8	50	6.3
¼	280	53	8	35	6.5
⅜	120	37	4	30	9.0
½	120	52	4	30	12.8
¾	80	56	4	20	13.8

▲ Weights are for black fittings.

cartons

malleable iron fittings *(continued)*

standard (black or galvanized)

cross: fig. 1107 *(continued)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
1	60	63	4	15	15.5
1¼	36	58	3	12	19.0
1½	24	52	3	8	17.0
2	16	51	2	8	25.0

Y-branch: fig. 1108 *(page pf-6)*

⅜	200	58	8	25	7.0
½	100	40	4	25	9.7
¾	80	54	4	20	13.0
1	60	62	4	15	15.0
1¼	40	67	4	10	16.3
1½	24	54	3	8	17.5
2	12	43	2	6	20.5

close pattern return bend: fig. 1117 *(page pf-8)*

½	200	63	8	25	7.7
¾	120	61	8	15	7.3
1	60	50	4	15	12.0
1¼	45	58	3	15	19.0
1½	30	57	3	10	18.7
2	18	58	3	6	19.0

medium pattern return bend: fig. 1118 *(page pf-8)*

½	200	72	8	25	8.8
¾	100	60	4	25	14.5
1	60	60	4	15	14.5
1¼	32	52	4	8	12.7
1½	30	63	3	10	20.5
2	16	57	2	8	27.5

open pattern return bend: fig. 1119 *(page pf-8)*

½	160	60	8	20	7.3
¾	80	53	4	20	13.0
1	60	74	4	15	18.0
1¼	30	56	3	10	18.0
1½	24	65	3	8	21.0
2	12	52	2	6	25.0

coupling: fig. 1121 *(page pf-7)*

⅛	720	43	18	40	2.3
¼	420	39	12	35	3.2
⅜	320	43	8	40	5.3
½	320	62	8	40	7.6
¾	160	48	4	40	11.8
1	100	48	4	25	11.8
1¼	60	43	4	15	10.5
1½	60	59	4	15	14.3
2	30	46	3	10	15.0

reducer: fig. 1125 *(page pf-7)*

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
¼ x ⅛	450	35	18	25	1.9
⅜ x ¼	300	36	12	25	2.9
⅜ x ⅛	360	40	12	30	3.3
½ x ⅜	240	41	8	30	5.0
½ x ¼	200	33	8	25	4.0
½ x ⅛	320	49	8	40	6.0
¾ x ½	200	53	4	50	13.0
¾ x ⅜	140	36	4	35	8.7
¾ x ¼	200	49	8	25	6.0
¾ x ⅛	120	32	4	30	7.5
1 x ¾	100	44	4	25	10.8
1 x ½	120	48	4	30	11.8
1 x ⅜	120	46	4	30	11.5
1 x ¼	120	46	4	30	11.5
1¼ x 1	90	63	6	15	10.6
1¼ x ¾	90	57	6	15	9.3
1¼ x ½	100	60	4	25	15.0
1½ x 1¼	60	57	4	15	14.0
1½ x 1	60	55	4	15	13.4
1½ x ¾	60	49	4	15	12.0
1½ x ½	80	63	4	20	15.5
2 x 1½	30	48	3	10	15.4
2 x 1¼	30	44	3	10	14.3
2 x 1	30	42	3	10	13.7
2 x ¾	30	40	3	10	13.0
2 x ½	45	58	3	15	19.0

extension piece: fig. 1137 *(page pf-9)*

⅜	400	44	8	50	5.3
½	320	53	8	40	6.4
¾	160	44	4	40	10.8
1	120	52	4	30	12.8

bushing, face: fig. 385 *(page pf-32)*

¼ x ⅛	2700	33	18	150	1.7
⅜ x ¼	1600	28	8	200	3.4
⅜ x ⅛	1600	40	8	200	4.8
½ x ⅜	1200	40	8	150	4.8
½ x ¼	800	41	8	100	5.0
¾ x ½	800	49	8	100	6.0
¾ x ⅜	800	70	8	100	8.5
¾ x ¼	400	42	8	50	5.0
1 x ¾	400	45	8	50	5.5
1 x ½	400	68	8	50	8.3
1 x ⅜	400	74	8	50	9.1
1 x ¼	400	76	8	50	9.4
1¼ x 1	280	58	8	35	7.0
1¼ x ¾	240	68	8	30	8.3
1¼ x ½	240	77	8	30	9.5
1½ x 1¼	200	38	4	50	9.2

▲ Weights are for black fittings.

malleable iron fittings *(continued)*

standard (black or galvanized)

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	master containers: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
bushing, face: fig. 385 *(continued)*					
1½ x 1	160	58	4	40	14.0
1½ x ¾	140	56	4	35	13.7
1½ x ½	140	59	4	35	14.3
2 x 1½	120	54	4	30	13.2
2 x 1¼	100	57	4	25	13.8
2 x 1	100	68	4	25	16.5
2 x ¾	100	71	4	25	17.3
2 x ½	100	73	4	25	17.8
2½ x 2	80	53	4	20	12.8
2½ x 1½	60	61	4	15	15.0
2½ x 1¼	60	70	4	15	17.0
bushing, hex: fig. 383 *(page pf-32)*					
¼ x ⅛	900	23	18	50	1.2
⅜ x ⅛	900	43	18	50	2.8
⅜ x ¼	450	20	18	25	1.0
½ x ⅜	450	27	18	25	1.4
½ x ¼	450	31	18	25	1.6
½ x ⅛	450	34	18	25	1.8
¾ x ½	300	34	12	25	2.8
¾ x ⅜	300	39	12	25	3.2
¾ x ¼	300	41	12	25	3.3
¾ x ⅛	400	52	8	50	6.4
1 x ¾	200	39	8	25	4.8
1 x ½	200	46	8	25	5.6
1 x ⅜	200	39	8	25	4.8
1 x ¼	200	44	8	25	4.8
1 x ⅛	200	51	8	25	6.0
1¼ x 1	200	62	8	25	7.5
1¼ x ¾	100	41	4	25	10.0
1¼ x ½	100	33	4	25	8.0
1¼ x ⅜	200	61	8	25	7.5
1¼ x ¼	160	51	8	20	6.3
1½ x 1¼	120	43	4	30	10.5
c 1½ x 1	100	53	4	25	13.3
c 1½ x ¾	100	51	4	25	12.7
c 1½ x ½	100	48	4	25	12.0
2 x 1½	80	58	4	20	14.3
c 2 x 1¼	60	51	4	15	12.7
c 2 x 1	60	47	4	15	11.7
c 2 x ¾	60	44	4	15	11.0
c 2 x ½	60	43	4	15	10.7
2½ x 2	60	68	4	15	16.5
c—cast iron					
cap: fig. 1124 *(page pf-8)*					
⅛	900	37	18	50	2.0
¼	480	33	12	40	2.7
⅜	480	49	12	40	4.0
½	200	31	4	50	7.5
¾	160	38	4	40	9.3
1	100	36	4	25	8.8
1¼	100	57	4	25	14.0
1½	80	58	4	20	14.3
2	60	61	4	15	15.0

▲ Weights are for black fittings.

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	master containers: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
plug, countersunk: fig. 390 *(page pf-33)*					
½	800	45	8	100	5.5
¾	400	40	8	50	4.8
plug, square head: fig. 387 *(page pf-33)*					
s* ⅛	1800	34	18	100	1.8
s* ¼	1800	70	18	100	3.8
s* ⅜	800	50	8	100	6.1
c* ½	600	64	4	150	16.0
c ¾	400	58	4	100	14.5
c 1	240	65	4	60	16.3
c 1¼	120	52	4	30	13.0
c 1½	100	61	2	25	15.3
c 2	60	55	4	15	13.7
s—steel; c—cast iron; *—solid					
locknut, hex: fig. 1134 *(page pf-8)*					
⅛	900	40	18	50	2.2
¼	900	34	18	50	1.8
⅜	900	44	18	50	2.4
½	600	42	12	50	3.4
¾	400	51	8	50	6.3
1	200	37	8	25	4.5
1¼	200	60	8	25	7.4
1½	100	37	4	25	9.0
2	100	53	4	25	13.0
waste nut, oval: fig. 1133 *(page pf-9)*					
¼	600	34	12	50	2.8
⅜	600	51	12	50	4.2
½	400	47	8	50	5.6
¾	400	61	8	50	7.3
1	280	56	8	35	6.6
1¼	100	43	4	25	10.3
1½	100	57	4	15	13.5
2	80	56	4	20	13.5
floor flange: fig. 1190 *(page pf-8)*					
c ¼	200	74	8	25	9.0
c ⅜	200	83	8	25	10.2
½	120	69	4	30	16.7
¾	120	80	4	30	19.5
1	80	72	4	20	17.5
1¼	60	56	3	20	18.2
1½	60	76	4	15	18.6
2	30	57	2	15	27.7
c—cast iron					

cartons

malleable iron fittings *(continued)*
extra heavy (black or galvanized)

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
90° elbow: fig. 1161 *(page pf-10)*					
¼	240	49	8	30	6.0
⅜	240	74	8	30	9.0
½	120	57	4	30	14.0
¾	80	62	4	20	15.3
1	60	70	4	15	17.3
45° elbow: fig. 1162 *(page pf-10)*					
¼	200	41	8	25	5.0
⅜	240	72	8	30	8.8
½	160	72	8	20	8.8
¾	80	57	4	20	14.0
1	60	65	4	15	15.8
90° street elbow: fig. 1170 *(page pf-10)*					
¼	240	44	8	30	5.3
⅜	240	66	8	30	8.0
½	120	54	4	30	13.0
¾	100	71	4	25	17.3
1	60	66	4	15	16.5
45° street elbow: fig. 1160 *(page pf-10)*					
¼	200	76	8	25	9.3
⅜	160	68	4	30	16.5
1	60	58	4	15	14.0
1¼	40	62	4	10	15.2
1½	32	69	4	8	17.0
2	18	65	3	6	21.0
tee: fig. 1164 *(page pf-11)*					
¼	240	74	8	30	9.0
⅜	160	72	8	20	8.8
½	80	57	4	20	14.0
¾	60	67	4	15	16.5
1	40	66	4	10	16.3
cap: fig. 1163 *(page pf-12)*					
¼	480	52	12	40	4.2
⅜	300	50	12	25	4.0
½	280	68	8	35	8.3
¾	200	74	8	25	9.0
1	100	60	4	25	14.5
1¼	60	58	4	15	14.0
1½	40	52	4	10	12.5
2	32	62	4	8	15.0
coupling: fig. 1166 *(page pf-12)*					
¼	280	52	8	35	6.3
⅜	160	46	8	20	5.5
½	160	70	8	20	8.5
¾	80	57	4	20	13.8
1	40	44	4	10	10.5

▲ Weights are for black fittings.

M. I. unions *bronze-to-iron ground joint*
(black or galvanized)

size, in.	master containers: no. of pieces	master containers: weight▲ lb.	cartons: no. of cartons	cartons: no. of pieces	cartons: weight▲ lb.
150 lb union: fig. 463 *(page pf-16)*					
* ⅛	300	45	12	25	3.6
¼	280	50	8	35	6.1
⅜	210	59	6	35	9.5
½	160	65	4	40	15.7
¾	120	67	4	30	16.2
¾ x ½	120	64	4	30	15.5
1	72	60	4	18	14.3
1¼	48	66	4	12	16.0
1½	36	57	3	12	18.7
2	24	60	2	12	29.0

*—300 lb. union furnished (fig. 459)

250 lb union: fig. 554 *(page pf-16)*					
⅛	300	45	12	25	3.6
¼	210	63	6	35	10.3
⅜	210	78	6	35	12.8
½	160	81	4	40	20.0
¾	120	99	4	30	24.4
1	72	90	4	18	22.1
1¼	48	78	4	12	19.0
1½	36	77	3	12	25.0
2	12	43	1	12	43.0
300 lb union: fig. 459 *(page pf-16)*					
⅛	300	45	12	25	3.6
¼	200	56	4	50	13.8
⅜	160	59	4	40	14.5
½	100	57	4	25	13.8
¾	80	68	4	20	16.8
1	40	51	4	10	12.5
1¼	45	75	3	15	24.3
1½	30	67	3	10	21.7
2	18	64	2	9	31.5
300 lb AAR union: fig. 571 *(page pf-41)*					
¼	200	64	4	50	15.8
⅜	200	89	8	25	11.0
½	100	62	4	25	15.2
¾	75	80	3	25	28.3
1	40	62	4	10	15.4
1¼	30	70	3	10	23.0
1½	24	72	2	12	35.2
2	18	81	2	9	40.0
boiler elbow, with union: fig. 1154 *(page pf-17)*					
½ x ½ x 1	40	54	4	10	13.0
¾ x ½ x 1	40	56	4	10	13.5
¾ x ¾ x 1	40	56	4	10	13.5

furnished galvanized only

boiler coupling, with union: fig. 1153 *(page pf-17)*					
½ x ½ x 1	60	67	4	15	16.5
¾ x ½ x 1	60	70	4	15	17.0
¾ x ¾ x 1	60	66	4	15	16.0

furnished galvanized only

cast iron fittings

standard (black only)

size, in.	cartons: no. of pieces	cartons: weight lb.	pallets: no. of cartons	pallets: no. of pieces
90° elbow: fig. 351 *(page pf-20)*				
½	150	60	39	5850
¾	100	60	39	3900
1	55	51	39	2145
1¼	30	44	39	1170
1½	20	39	39	780
2	20	63	20	400
reducing elbow: fig. 352 *(page pf-21)*				
¾ x ½	120	62	39	4680
1 x ¾	70	54	39	2730
1 x ½	85	57	39	3315
1¼ x 1	40	49	39	1560
1¼ x ¾	50	51	39	1950
1¼ x ½	55	59	39	2145
1½ x 1¼	25	44	39	975
1½ x 1	30	44	39	1170
2 x 1½	25	65	20	500
2 x 1¼	25	59	20	500
45° elbow fig. 356 *(page pf-20)*				
½	150	56	39	5850
¾	100	55	39	3900
1	60	50	39	2340
1¼	35	47	39	1365
1½	25	45	39	975
2	20	58	20	400
tee: fig. 358 *(page pf-22)*				
½	100	56	39	3900
¾	60	51	39	2340
1	35	44	39	1365
1¼	20	41	39	780
1½	20	54	20	400
2	10	43	20	200
reducing tee: fig. 359 *(page pf-22)*				
¾ x ¾ x ½	70	54	39	2730
1 x ¾ x ¾	50	50	39	1950
1 x ½ x 1	45	49	39	1755
1 x 1 x ¾	45	50	39	900
1 x 1 x ½	50	51	39	1950
1¼ x 1¼ x 1	25	44	39	500
1¼ x 1¼ x ¾	25	40	39	975
1¼ x 1¼ x ½	30	45	39	1170
1¼ x 1 x 1	25	39	39	975

size, in.	cartons: no. of pieces	cartons: weight lb.	pallets: no. of cartons	pallets: no. of pieces
reducing tee: fig. 359 *(continued)*				
1¼ x 1 x ½	35	45	39	1365
1¼ x ¾ x 1¼	25	44	39	975
1¼ x ½ x 1¼	25	41	39	975
1½ x 1½ x 1¼	25	61	20	500
1½ x 1½ x 1	30	64	20	600
1½ x 1½ x ¾	20	39	39	780
1½ x 1½ x ½	20	37	39	780
1½ x 1¼ x 1¼	25	57	20	500
1½ x 1¼ x 1	20	40	39	780
1½ x 1¼ x ½	25	42	39	975
1½ x ½ x 1½	20	43	39	400
2 x 2 x 1½	15	53	20	300
2 x 2 x 1¼	15	51	20	300
2 x 2 x 1	15	46	20	300
2 x 2 x ¾	20	58	20	400
2 x 2 x ½	20	54	20	400
2 x 1½ x 2	15	56	20	300
2 x 1¼ x 1½	15	49	20	300
2 x 1½ x 1	20	54	20	400
2 x 1½ x ½	25	59	20	500
2 x 1¼ x 2	15	56	20	300
2 x 1 x 2	15	52	20	300
2 x ¾ x 2	15	50	20	300
2 x 1¼ x 2	10	33	39	390
reducer: fig. 367 *(page pf-31)*				
1 x ½	100	54	39	3900
floor flange: fig. 1006 (galvanized) *(page pf-33)*				
½	90	61	39	3590
¾	90	67	39	3510
1	60	67	39	2340
1¼	50	56	39	1950
1½	35	52	39	1365
floor flange: fig. 1006 (black) *(page pf-33)*				
½	90	61	39	3510
¾	90	67	39	3510
1	60	67	39	2340
1¼	50	56	39	1950
1½	35	52	39	1365

cartons

cast iron fittings

drainage (black or galvanized)

size, in.	cartons: no. of pieces	cartons: weight lb.	pallets: no. of cartons	pallets: no. of pieces
90° short turn elbow (black): fig. 701 *(page pf-36)*				
1¼	35	56	39	1365
1½	20	39	39	780
2	20	61	20	400
90° short turn elbow (galv.): fig. 701 *(page pf-36)*				
1½	20	40	39	780
2	20	64	20	400
90° reducing short turn elbow (black): fig. 701R *(page pf-36)*				
1½ x 1¼	25	43	39	975
90° long turn elbow (black): fig. 702 (page pf-36)				
1½	20	45	39	400
2	15	55	20	300
60° short turn elbow (black): fig. 703 *(page pf-37)*				
1½	20	47	39	780
45° short turn elbow (black): fig. 705 *(page pf-37)*				
1¼	35	49	39	1365
1½	25	43	39	975
2	20	56	20	400
45° short turn elbow (galv.): fig. 705 *(page pf-37)*				
1¼	25	44	39	975
2	20	58	20	400
22½° elbow (black): fig. 707 *(page pf-37)*				
1½	25	42	39	975
90° short turn Y-branch, tee pattern (black): fig. 726 *(page pf-40)*				
1½	20	62	20	300
2	10	51	20	200
90° short turn Y-branch, tee pattern (galv.): fig. 726 *(page pf-40)*				
1½	15	47	20	300
2	10	52	20	200
90° reducing short turn Y-branch, tee pattern (black): fig. 727 *(page pf-40)*				
1½ x 1½ x 1¼	15	48	20	300
2 x 2 x 1½	10	42	20	200
90° reducing short turn Y-branch, tee pattern (galv.): fig. 727 *(page pf-40)*				
2 x 2 x 1½	10	43	20	200
45° Y-branch (black): fig. 734 *(page pf-44)*				
1½	15	61	20	300
bath P-trap (black): fig. 754 *(page pf-46)*				
1½	10	37	20	200

steel pipe nipples in "25"-packs"

standard and extra strong+ welded steel (black and galvanized▲) • sizes ⅛ to 3-inch+
schedule 40 and 80 seamless steel pressure pipe (black only) • sizes ⅛ to 1½-inch△
schedule 40 and 80 seamless steel pipe (black only) • sizes 2 to 3-inch△

nom. pipe size	length in.	no. of pieces	approx weight, lb. standard and Sch. 40	approx weight, lb. extra strong and Sch. 80
	close	25	.4	.5
	1½	25	.7	1.0
	2	25	1.0	1.3
	2½	25	1.3	1.6
	3	25	1.5	2.0
	3½	25	1.7	2.3
	4	25	2.0	2.6
	4½	25	2.2	3.0
⅛	5	25	2.4	3.1
	5½	25	2.8	3.4
	6	25	3.0	3.9
	7	25	3.6	4.5
	8	25	4.0	5.2
	9	25	4.4	5.8
	10	25	5.1	6.5
	11	25	5.6	7.1
	12	25	6.1	7.8
	close	25	.6	.9
	1½	25	1.1	1.5
	2	25	1.6	2.0
	2½	25	2.0	2.6
	3	25	2.4	3.2
	3½	25	2.9	3.8
	4	25	3.3	4.4
	4½	25	3.7	4.9
¼	5	25	4.2	5.4
	5½	25	4.6	6.3
	6	25	5.0	6.9
	7	25	6.1	7.9
	8	25	6.9	8.8
	9	25	7.8	9.9
	10	25	8.6	11.0
	11	25	9.5	12.1
	12	25	10.3	13.3
	close	25	1.0	1.3
	1½	25	1.5	2.1
	2	25	2.0	2.9
	2½	25	2.6	3.6
	3	25	3.2	4.4
	3½	25	3.8	5.2
	4	25	4.4	5.9
	4½	25	5.0	6.5
⅜	5	25	5.4	7.3
	5½	25	6.0	8.1
	6	25	6.6	8.8
	7	25	8.4	10.4
	8	25	8.8	12.0
	9	25	9.7	13.5
	10	25	11.9	15.0
	11	25	12.1	16.6
	12	25	13.6	18.1

nom. pipe size	length in.	no. of pieces	approx weight, lb. standard and Sch. 40	approx weight, lb. extra strong and Sch. 80
	close	25	1.5	2.1
	1½	25	2.1	3.0
	2	25	2.8	4.0
	2½	25	3.6	5.0
	3	25	4.6	6.2
	3½	25	5.5	7.2
	4	25	6.3	8.5
	4½	25	7.3	9.5
½	5	25	8.0	10.5
	5½	25	9.3	11.9
	6	25	9.8	13.0
	7	25	11.5	15.3
	8	25	13.1	17.6
	9	25	15.4	19.8
	10	25	16.6	22.1
	11	25	18.6	24.4
	12	25	20.0	26.8
	close	25	2.5	3.4
	1½	25	2.8	3.8
	2	25	3.9	5.1
	2½	25	5.1	6.8
	3	25	6.3	8.2
	3½	25	7.7	9.5
	4	25	8.7	11.2
	4½	25	9.7	12.8
¾	5	25	11.5	14.4
	5½	25	12.1	15.9
	6	25	14.0	17.1
	7	25	15.5	20.5
	8	25	17.7	23.6
	9	25	20.5	26.7
	10	25	22.3	30.3
	11	25	25.1	32.8
	12	25	28.0	35.9
	close	25	3.6	5.0
	...	...	...	...
	2	25	5.6	7.1
	2½	25	7.0	9.7
	3	25	8.9	12.0
	3½	25	11.1	13.6
	4	25	12.8	16.3
	4½	25	14.5	19.1
1	5	25	16.3	20.1
	5½	25	17.7	23.3
	6	25	20.0	25.5
	7	25	22.5	29.4
	8	25	26.9	33.9
	9	25	30.1	38.4
	10	25	34.5	43.0
	11	25	36.5	47.5
	12	25	40.0	52.0

cartons

steel pipe nipples *(continued)*

nom. pipe size	length in.	no. of pieces	approx weight, lb. standard and Sch. 40	approx weight, lb. extra strong and Sch. 80
	close	25	5.9	8.0
	...	...	...	...
	2	25	7.5	10.7
	2½	25	9.7	13.8
	3	25	12.1	16.1
	3½	25	14.2	19.5
	4	25	17.1	22.4
	4½	25	20.1	26.0
1¼	5	25	21.6	28.9
	5½	25	24.0	31.1
	6	25	25.5	34.5
	7	25	29.8	40.6
	8	25	35.1	46.9
	9	25	39.6	53.1
	10	25	44.6	59.4
	11	25	48.5	65.6
	12	25	54.5	71.9
	close	25	7.7	11.3
	...	...	...	...
	2	25	9.2	12.5
	2½	25	11.4	16.3
	3	25	14.6	19.8
	3½	25	17.6	24.5
	4	25	20.1	27.4
	4½	25	21.7	31.5
1½	5	25	24.8	34.6
	5½	25	27.5	38.0
	6	25	30.7	41.8
	7	25	35.2	49.2
	8	25	40.3	56.7
	9	25	48.2	64.3
	10	25	53.2	71.8
	11	25	57.0	79.4
	12	25	64.3	87.0
	close	25	11.4	18.5
	...	...	...	...
	...	...	...	...
	2½	25	15.6	22.9
	3	25	19.9	26.9
	3½	25	23.6	33.5
	4	25	27.3	38.5
	4½	25	30.4	43.9
2"	5	25	34.6	48.6
	5½	25	39.6	54.3
	6	25	42.6	59.0
	7	25	49.6	68.0
	8	25	56.5	78.4
	9	15	38.8	53.3
	10	15	44.9	59.6
	11	15	48.6	65.9
	12	15	52.3	72.2

nom. pipe size	length in.	no. of pieces	approx weight, lb. standard and Sch. 40	approx weight, lb. extra strong and Sch. 80
	close	25	21.9	30.6
	...	...	...	...
	...	...	...	...
	...	...	...	...
	3	25	25.3	38.0
	3½	25	33.4	44.9
	4	25	37.1	54.3
	4½	25	42.1	60.7
2½"▪	5	25	48.7	68.0
	5½	25	54.6	75.2
	6	25	63.0	83.4
	7	10	30.7	41.5
	8	10	35.1	47.9
	9	10	39.0	54.3
	10	10	45.1	64.2
	11	10	48.2	67.0
	12	10	55.0	73.4
	close	25	30.6	43.4
	...	...	...	...
	...	...	...	...
	...	...	...	...
	3	25	33.4	49.3
	3½	25	42.4	59.9
	4	25	49.5	69.8
	4½	25	54.4	79.7
3"▪	5	15	39.8	54.8
	5½	15	44.4	60.4
	6	15	46.9	67.8
	7	10	38.6	55.5
	8	10	45.4	64.1
	9	10	52.5	72.6
	10	10	57.1	81.2
	11	10	64.6	89.7
	12	10	68.9	98.2

Notes:

▪ Some lengths of 2, 2½ and 3-inch nipples are packed less than 25 pieces to a carton as indicated under "no. of pieces."

▲ Weights shown are for black nipples.

Δ Schedule 40 and 80 nipples cartoned only in lengths close to 6-inch.

+ Extra Strong galvanized welded nipples cartoned only in pipe sizes ½ to 2-inch and lengths close to 6-inch.

master containers for "25 packs"

standard welded nipples only • (black and galvanized)

nom. pipe size	length in.	no. of cartons	no. of pieces	approx weight lb.	nom. pipe size	length in.	no. of cartons	no. of pieces	approx weight lb.	nom. pipe size	length in.	no. of cartons	no. of pieces	approx weight lb.
	close	4	100	1.6		close	8	200	12.7		close	4	100	23.7
	1½	4	100	3.1		1½	8	200	17.2		...	...	...	...
	2	4	100	4.1		2	8	200	23.0		2	4	100	29.8
	2½	4	100	5.3		2½	8	200	29.1		2½	4	100	39.0
	3	4	100	6.1		3	4	100	18.6		3	2	50	24.3
⅛	3½	4	100	7.0	½	3½	4	100	22.2	1¼	3½	2	50	28.6
	4	4	100	8.1		4	4	100	25.2		4	2	50	34.4
	4½	4	100	9.2		4½	4	100	29.3		4½	2	50	40.3
	5	4	100	9.9		5	4	100	32.3		5	2	50	43.3
	5½	4	100	11.3		5½	4	100	37.5		5½	2	50	50.5
	6	4	100	12.3		6	4	100	39.5		6	2	50	53.5
	close	4	100	2.6		close	8	200	20.5		close	2	50	15.5
	1½	4	100	4.6		1½	8	200	22.6		...	...	...	...
	2	4	100	6.7		2	8	200	31.7		2	2	50	18.6
	2½	4	100	8.2		2½	8	200	41.0		2½	2	50	23.0
	3	4	100	9.9		3	4	100	25.3		3	4	100	58.4
¼	3½	4	100	11.7	¾	3½	4	100	31.0	1½	3½	4	100	70.8
	4	4	100	13.6		4	4	100	35.1		4	3	75	60.5
	4½	4	100	15.2		4½	4	100	39.3		4½	2	75	65.6
	5	4	100	17.1		5	4	100	46.1		...	...	...	...
	5½	4	100	18.7		5½	4	100	48.4		...	...	...	...
	6	4	100	20.2		6	4	100	56.0		...	...	...	...
	close	4	100	4.2		close	4	100	14.5		close	2	50	22.9
	1½	4	100	6.2		...	...	...	...		...	...	...	...
	2	4	100	8.3		2	4	100	22.7		...	...	...	...
	2½	4	100	10.6		2½	4	100	28.3		2½	2	50	31.3
	3	4	100	13.0		3	2	50	17.8		3	3	75	59.9
⅜	3½	4	100	15.5	1	3½	2	50	22.2	2	3½	3	75	71.0
	4	4	100	17.9		4	2	50	25.2		...	...	...	...
	4½	4	100	20.2		4½	2	50	29.0		...	...	...	...
	5	4	100	22.0		5	2	50	32.7		...	...	...	...
	5½	4	100	24.2		5½	2	50	35.6		...	...	...	...
	6	4	100	26.8		6	2	50	40.1		...	...	...	...

assorted cartons

standard welded nipples only • (black and galvanized)

nom. pipe size	length in.	number of pieces		approx weight, lb.	nom. pipe size	length in.	number of pieces		approx weight, lb.	nom. pipe size	length in.	number of pieces		approx weight, lb.
	close	4				close	6							
	1½	3				...	..							
...	2	3				2	4							
	2½	3				2½	3							
	3	2				3	2							
½	3½	2	25	4.6	¾	3½	2	25	6.0					
	4	2				4	2							
	4½	1				4½	1							
	5	2				5	2							
	5½	1				5½	1							
	6	2				6	2							
	close	20				close	25				close	15		
	1½	10				...	..				...	..		
	2	15				2	20				2	12		
	2½	10				2½	10				2½	5		
	3	10				3	10				3	12		
½	3½	5	100	17.8	¾	3½	5	100	22.7	1	3½	3	75	28.1
	4	10				4	10				4	12		
	4½	5				4½	5				4½	3		
	5	5				5	5				5	5		
	5½	5				5½	5				5½	3		
	6	5				6	5				6	5		

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figure number index

sales offices and warehouses

ARIZONA
Phoenix, (85017) 3131 West Thomas Road
CALIFORNIA
Fresno, (93717) 3081 East Hamilton Avenue
Los Angeles, (90054) 520 Mateo Street
Oakland (Emeryville), (94604) 6121 Hollis Street
Sacramento, (95814) 431 Richards Boulevard
San Jose, (95112) 1853 South Seventh Street
COLORADO
Denver, (80202) 2175 Fifteenth Street
FLORIDA
Tampa, (33605) 2705 Adamo Drive
GEORGIA
Atlanta, (30302) 645 Northside Drive, N.W.
IDAHO
Pocatello, (83201) 650 South First Avenue
ILLINOIS
Chicago, (60609) 4425 South Western Boulevard
LOUISIANA
New Orleans, (70125) 7136 Washington Avenue
MARYLAND
Columbia, (21043) 9585 Snowden River Parkway
MASSACHUSETTS
Canton, (02021) 120 Shawmut Road
MICHIGAN
Detroit, (48213) Trolley Industrial Drive
MINNESOTA
Bloomington, (55431) 1201 W. 96th Street
MISSOURI
Kansas City, (64116) 2316 Burlington Avenue
St. Louis, (63110) 1615 South Kingshighway
MONTANA
Billings, (59101) 13 North Twenty-Third Street
Great Falls, (59401) 12 Third Street, Northwest
NEW JERSEY (Metro. N.Y.C. area)
Lincoln Park, (07035) 99 Beaver Brook Road
NEW YORK
Buffalo, (14205) 1374 Clinton Street
NORTH CAROLINA
Charlotte, (28208) 1431 West Morehead Street
OHIO
Chillicothe, (45601) 350 South Douglas Avenue
Cincinnati, (45237) 1025 Laidlaw Avenue
Cleveland, (44103) 1294 East 55th Street
OKLAHOMA
Tulsa, (74145) 4118 South 70th East Avenue
OREGON
Portland, (97210) 3240 Northwest 29th Avenue
PENNSYLVANIA
Philadelphia, (19134) Erie Avenue and D Street
Pittsburgh, (15233) 1321 Ridge Avenue
TENNESSEE
Memphis, (38112) 315 Cumberland Street
TEXAS
Dallas, (75240) 4821 Simonton Road
Houston, (77001) 6999 Old Clinton Road
WASHINGTON
Seattle, (98121) 3101 Elliott Avenue
Spokane, (99202) East 909 Sprague Avenue
WISCONSIN
Milwaukee, (53201) 1819 West St. Paul Avenue

executive offices
Grinnell Company, Inc.
Providence, R. I. (02901) 260 West Exchange Street

Grinnell Sales Limited
ALBERTA
Calgary, 4005-11th Street, S.E.
Edmonton, 11340-120th Street
BRITISH COLUMBIA
Vancouver (6), 1150 Raymur Avenue
MANITOBA
Winnipeg (21), 777 Madison Street
ONTARIO
Toronto (18), 10 North Queen Street
QUEBEC
Montreal (9), 3980 Jean Talon Street, West

Grinnell G.m.b.H
WEST GERMANY
4000 Dusseldorf

Grinnell de Mexico S.A. de C.V.
MEXICO
Norte 45-#709, Mexico 15, D.F. (office only)

export office
NEW YORK
New York, N.Y. (10022) 400 Park Avenue

manufacturing plants
ARKANSAS
Augusta
GEORGIA
Atlanta
KENTUCKY
Princeton
MAINE
So. Windham
NORTH CAROLINA
Kernersville
OHIO
Warren
PENNSYLVANIA
Columbia
Wrightsville
RHODE ISLAND
Cranston
Kingston
TENNESSEE
Henderson
TEXAS
Temple

in CANADA
ONTARIO
Brighton
Oshawa
Toronto

GRINNELL

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10/7/15 ITT Response to EPA 104(e) re: Keddy Mill Superfund Site

ITT Exhibit E: Insurance Correspondence 1961

- 2 page letter dated 9/20/61 regarding fire insurance policies for Keddy Manufacturing Company
- 2 page letter dated 9/29/61 regarding liability insurance policies for Keddy Manufacturing Company
- 1 page list of Insurance Policies for Keddy Manufacturing Company (1960-1961)

Mr. Arthur Davies

September 29, 1961

Ward H. Cann

KEDDY MANUFACTURING COMPANY
LIABILITY INSURANCE, ETC.

Dear Sir:

My letter of September 20 dealt with the fire and extended coverage insurance for the Maine and Massachusetts plants. I have just received two liability insurance policies which Mr. Hart obtained for my examination. These are:

U. S. Fidelity and Guaranty Company	Policy No. CGL 252488
Aetna Insurance Company	Policy No. CGL 733583

In both policies the Property Damage limit per accident should be increased from $250,000. to $500,000.

Both of these policies are Comprehensive General Liability Insurance policies. One has been limited to Maine and excludes Products Liability. The other one is evidently expected to cover the entire products liability hazard.

I recommend that the U. S. Fidelity policy be eliminated and that all operations of the Keddy Manufacturing Company shall be included under the Aetna policy. Intra-company sales or transfers would be eliminated, of course, as they are now from the base for Products Liability premium.

It is important that the <u>one</u> insurance company shall insure the liability for both the manufacturing and finishing of the product without any opportunity for controversy as to the scope of the two policies. Although an attempt has been made to delimit one policy, the basis for conflict is still there. This is because each policy is a "comprehensive" policy and is essentially intended to cover <u>all locations</u> of the insured.

The Massachusetts policy avoids mention of the Maine location and collects no premium for this location. Still it is hoped that this Massachusetts policy will provide products liability insurance for a manufacturing defect in spite of the fact that the operations in this policy are described only as "Machine Shop". Whenever the insurance is needed, it is not good to have to depend on technicalities to demonstrate the existance of coverage.

In respect to any contract, it is advisable to have a meeting of the minds in advance, so after a loss the legal department of the insurance company will not try to upset what was done by the underwriter.

Mr. Arthur Davies
(9-29-61)

The coverage should be corrected in respect to elevators. Lessor's risk only is now covered in the Maine policy, which is unsatisfactory.

I have not seen any evidence of automobile liability insurance. Coverage should be maintained in respect to owned, hired and non-owned vehicles, with the same limits as for general public liability, namely, $250/500,000. for bodily injuries and $500,000. property damage.

I have not seen the boiler insurance policy but have received some information about it. The policy should be written to provide broad coverage rather than limited coverage. It now covers only the boiler at the Maine plant. The policy should be extended to include hot-water heaters and unfired pressure vessels such as compressed-air tanks, hydro-pneumatic tanks and any paint tanks at both plants.

I am turning over to Mr. Hart all of the policies which I have so that they may be returned to Keddy Manufacturing Company.

Very truly yours,

Insurance Department

ED.

Mr. Arthur Davies

September 20, 1961

KEDDY MANUFACTURING COMPANY
INSURANCE

Ward H. Gann

Dear Sir:

My examination of the fire insurance policies reveals that the buildings are very much under-insured, and the insurance on contents at Middleton, Massachusetts, is badly arranged.

MAINE PLANT

From my conversation with Mr. Keddy, it develops that he would expect any fire damage to be limited to the wooden roof. As arranged, the insurance will cover loss up to $50,000. It is reasoned, because the building is brick and fire-resistive, except for the roof, that no greater fire loss will occur and that loss from other perils is not likely.

This is a common approach to insurance placement by small concerns and accounts for the fact that most of these companies never resume business after a bad loss.

Our practice should be to insure to 90% of the actual insurable value and let the rate reflect the minimum hazards due to the type of construction, sprinkler protection, public fire department, etc. We should not gamble that a severe windstorm will not destroy the building or that an airplane will not fall on it. These risks are not too great, so the premiums are not excessive.

It is and should be our company policy to insure against catastrophe. For instance, in the event of total loss, we would probably have to invest another $400,000 to resume operations. By insuring what we have to 90% of its insurable value, we could hope to collect most of the new money from the insurance companies. Thus we will be insuring to protect a favorable financial position and not depend on chance.

I recommend that we ask Marsh & McLennan of Boston to make a survey of the insurance and the property. We expect their engineer will be able to make some recommendations for improving the risk so that we could effect a substantial rate reduction and possibly obtain better protection and avoid a proportionate increase in premium.

Mr. Arthur Davies
(9-20-61)

MASSACHUSETTS PLANT

This plant is unsprinklered and if the frame buildings are destroyed in a fire the machinery and equipment will be worthless. Even though the rates are high, the total insurable value should be covered. A partial loss is unlikely.

In my opening paragraph I mentioned that the insurance on contents is badly arranged. The policies provide $107,000 insurance on contents, including stock, and $87,000 on furniture and fixtures and machinery, excluding stock. In the event of loss, the conflict between these companies will not only complicate settlement but will probably result in our failure to collect some of the loss on the equipment. The policies should be worded all alike, or some policies could be written on stock only. Even though the stock is non-combustible, it can be rendered unsaleable in a fire.

CONCLUSION

Marsh & McLennan should be invited to survey the insurance and the property at both locations. Marsh & McLennan will require that Keddy Manufacturing Company shall give them a separate "broker of record" letter in respect to each plant. Marsh & McLennan will outline what they need. In each case the letter is addressed to the respective rating bureau and authorises the bureau to make the rating schedule available to Marsh & McLennan.

The rate make-up reveals what charges have been added into the rate for specific physical conditions. If some conditions no longer exist, these charges can be eliminated. If the public fire protection has improved, a credit is due. Further, Marsh & McLennan can tell us what savings can be effected by improving the risk.

Beyond this Marsh & McLennan can be expected to give us their estimates of the insurable value of the buildings. (These will not be detailed appraisals but they will serve our purpose.)

I suggest that Marsh & McLennan's Boston office be contacted without delay and that they be told that the management is now ready to put the insurance in good order and is anxious to get it done before a major loss occurs.

Very truly yours,

Ward H. Cann, Manager
Insurance Department

Keddy Manufacturing Corp.

Birch Road
Middleton, Massachusetts

Company	Policy No.	Policy Dates	Coverage	
Aetna Ins. Co.	CGL090037	8/60 to 8/61	General Liability	250M/500M
Aetna Ins. Co.	WC437767	8/60 to 8/61	Workmen's Comp.	
U. S. Fidelity & Guaranty	693650	1/61 to 1/62	Auto Liability	300M/100M
Motors Ins. Corp.	314242LY	2/60 to 2/62	Collision	50. Ded.
Boston Ins. Co.	725252	4/61 to 4/62	Collision	50. Ded.
Boston Ins. Co.	724531	5/60 to 5/61	Collision	50. Ded.
Boston Insurance Co.	724558	5/60 to 5/61	Collision	50. Ded.
Boston Insurance Co.	724567	5/60 to 5/61	Collision	50. Ded.

ITT Corporation
1133 Westchester Avenue
White Plains, NY 10604

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